EXTERNAL FACTORS AND COMPLETION OF CONSTRUCTION PROJECTS IN KENYA: A CASE STUDY OF THE DEPARTMENT OF HEALTH, MAKUENI COUNTY, KENYA

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DECLARATION

I declare that this applied research project is my original work and has not been presented in any other university for academic credit

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This applied research project was conducted under our supervision and is submitted with our approval as university supervisors.

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DEDICATION

This work is dedicated to my parents, Dr Zachary Kibore and Mrs Florence Kibore, my wife, Major (Dr) Sylvia Mulandi and my lovely son, Levi Zachary Kibore, who offered me motivation and joy as I embarked on this beautiful journey. My focus and strength is derived from my faith in God and the support of my family.

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ABSTRACT

Construction projects face a myriad of challenges in progress. External factors in the study included political factors, socio-economic factors and technological factors. The main objective of this study was to determine the effect of external factors on completion of construction projects at the department of health, Makueni County, Kenya. The specific objectives were the effect of political, socio-economic and technological factors on the completion of construction projects in the department of health, Makueni County, Kenya. The theoretical framework included the theory of constraints, the resource dependency theory and the social-technology theory. The target population was the 238 projects in health facilities in Makueni county initiated between financial year 2021/2022 and 2022/2023. The respondents were the facility managers who are also the Health Facility Project Management Committee secretaries. Cross sectional Analytic study approach was utilized in this study. A stratified sampling approach was used. The sample size was 150 projects. Primary data was gathered using a structured questionnaire. The pilot study was conducted at Wote-Nziu Ward in Makueni Sub-County. Comparison was done between independent and dependent variables. Continuous variables included the ages of respondents and the years of service. Categorical variables were expressed as frequencies and proportions. Chi-square test was used to determine association between variables. Multivariate logistic regression analysis was used to determine the effect of significant external factors on completion of construction projects. Statistical significance was assumed at $P<0.05$. Majority of the study participants were aged between 31.0 and 40.0 years old (56.0%), were nurses (77.3%), had managed their facility for over 5 years (74.7%) and were working in a Dispensary (77.3%). The male and female participant ratio was 1:1. There was less likelihood of the projects being completed in the presence of political involvement, transition in leadership, and contract payment (OR 0.1, 0.7 and 0.3 respectively). Political involvement and contract payment were found to be statistically significant when it came to project not being completed (p 0.001 and p 0.004 respectively). Projects were 2.7 times more likely to be completed with the availability of raw materials. Raw material availability was significantly associated with completion of projects (p 0.03). Multivariate analysis showed increased odds of completing construction projects from 2.7 to 5.3 times when raw materials were available. The study concluded that political factors and socio-economic factors significantly affect completion of construction projects. The study recommends that key stakeholders involved in the construction management process such as politicians be taken through monitoring and evaluation training to ensure that projects are well management and all risks averted. The researcher recommends a comparative study on the effect of technological factors on completion of construction projects.

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LIST OF ABBREVIATIONS/ACRONYMS

CIDP- County Integrated Development Plan

DANIDA- Danish International Development Agency

ECM- Executive Committee Member

FIDIC- The International Federation of Consulting Engineers

GDP- Gross Domestic Product

HFPMC- Health Facility Project Management Committee

KNHA- Kenya National Highway Authority

MOH- Ministry of Health

PPP- Private Public Partnerships

OPERATIONAL DEFINITION OF TERMS

Chief Officer- This is the Accounting Officer for a given Ministry in a County *(Source: Council of Governors handbook, Kenya).*

ECM- This is an Executive Committee Member appointed by the Governor to represent a Ministry within a County *(Source: Council of Governors handbook, Kenya).*

HFPMC- This refers to the Health Facility Project Management Committee in charge of overseeing project and other development activities within a given health facility. It constitutes of a secretary (facility manager), a chairman appointed by the ECM (Health), two members (Elected by the community) and county engineer. The committee is a powerful entity that can dismiss a project if it foresees any major problem. The committee receives an allowance of 2% of the project cost. The committee approves payment of the 10% retained fee after conducting a six month post construction quality inspection with the support of the county engineer. *(Source: Council of Governors handbook, Kenya).*

CHAPTER ONE:

INTRODUCTION

1.1 Introduction

This study investigated the consequences of exterior aspects on construction developments in the Ministry of Health. The study utilized a case study of the department of health in Makueni County. This chapter highlighted the main variables, the data on study background, the problem statement, the study objectives, the research questions, study hypothesis, significance of the study, the scope, limitations and delimitations, the assumptions of the study, the theoretical and conceptual frameworks.

1.2 Background of the study

Global perspective on construction revealed that political factors have been shown to be key barriers or enhancers of project completion. Governmental interference, leadership changeovers and delays in contract payments can have negative implications depending on the political interest at any given time, place or person. Beyene (2023) directed an important study investigating the impact of political factors on completion of construction project in Addis Ababa, Ethiopia. The bulk of the construction projects worked on in Addis Ababa city experienced various degrees or magnitudes of time clogging in which the projects delayed in their completion. Following the different problems encountered during the developmental stages such as inception, design, and implementation phases, the projects were exposed to unforeseen time overruns compromising overall performance of the projects. This led to the general resolve to

detect the actual causes of adjournment so as to diminish or disprove the corresponding adverse controls. This study primarily expected to be investigating and analyzing the potential factors causing venture time teeming in the city so that the imperative factors can be identified and the applicable remedial measures can possibly be forwarded. The role of data collection, the study applied a semi-structured questionnaire survey. The questionnaire was distributed to 121 respondents encompassing practitioners and experts actively working in the construction industry. Fifty-four significant barring factors were identified and grouped under ten categories according to the similarity of their origin. In order to identify the most noteworthy factors, severity investigation based on the principle of relative importance index was carried out. Therefore, the top most significant and least significant factors were identified. The top four most influential factors identified were reluctance of specialists, inaccurate guesstimate of contract duration, delay in consents and late verdict making, and slow organization of labor whereas inadequacy of billed funds, low inspiration, and absence of enticements to contractors were the three least significant causes identified. To limit the adverse impact of the factors, the application of a comprehensive work breakdown structure, proper duty assignment, earned value belief, and project software were proposed as mitigation measures to be implemented. The finding of the study will shake the key experts and practitioners engaging in the city's construction industry to focus on managing the severe factors. The study entailed a survey of 11 respondents who practiced actively in the construction industry. Changes in leadership during elections were a significant factor. Lack of continuity after elections meant that white elephant projects remained unfinished. Delay in payment of contracts to stalling of major construction projects including

hospitals and schools. Transitions in leadership and timeliness of payments of contracts were identified as significant challenges to project completion in several construction projects (Beyene, 2023).

Moses et al (2019) directed an important study to explore the effect of micro and macro environment on implementation of relevant partnerships in the construction industry in Kenya. The study gauged the political backdrops and the dexterity level within the public segment. The study was an analytic cross-sectional survey in context. The population entailed three public private partnerships in the country. A sample size of 31 projects was acquired by use of a sample frame. Several important studies have been done in Kenya on the influence of politics on construction projects with a keen interest on the local contexts. The study dogged that lack of governmental goodwill will have an equivalent impact on the completion of construction projects. The Kenyan electoral process as well as African processes are infamous for leading to filibustering of projects, be they constructions or otherwise. County governments have experienced varios challenges consequent to poor planning. Local county governments experience prevaricating of construction projects countrywide. According to Moses, K et al ((2019) Public Private Partnership (PPP) can be defined as long term agreements between the Governments in play and the private sector. There is a great deficit of goal oriented partnerships in Kenya. The private sector cushions the public from risks due to a financial/asset base. The two sectors share the rewards. A conducive sector for the private sector will spur economic growth. Organizations in Kenya have recently grown interested in PPP following devolution and the growth of counties. Business people in Kenya still report a harsh political environment. Corruption in Kenya has been linked to failure of

PPPs. Ease of access to government tenders is riddled with corruption and bribes. African countries experiencing political instability tend to lag behind in construction development(Baithili et al., 2019). Apportionment of government propositions to cronies by legislators has been a spine in the flesh of many prospective developers. Postponement in payment of contracts is a mutual challenge in the county governments that are still grappling to prove that devolution was geared towards betterment of the populace. Health projects are some of the projects that are commonly affected with many county officers working in the department (Moses et al., 2021).

Osman et al (2019) directed an important study evaluating features affecting the completion of construction projects in Mombasa, Kenya. The study aimed to gauge how external factors sway project implementation performance in building construction projects in Kenya and also to assess how leadership factors affect completion of projects. The study sought to interrogate how cash flow factors sway project implementation performance in building construction projects in Kenya, and to observe how variation of the project latitude impacts project implementation performance in building construction projects in Kenya. The target was a total of 220 respondents. This led to a sample size of 33 respondents that was derived by appropriate equations. The sample size entailed government serving organizations, consultant organizations and contractors in the vicinity of Mombasa County. Data was collected by use of questionnaires. Descriptive statistics used in data analysis by the reliance of statistical packages for social sciences (SPSS). Data arrangement entailed frequency tallies, percentages, mean and standard deviation. Testing of the hypothesis was done using the rightfully fitting chi-square test due to the appropriateness with the study. The study derived that variation of scope

factors, Cash flows features, Leadership aspects and Environmental aspects were significant all with a level of 0.000 when assessed for a relationship with project implementation performance. The beta coefficients of constructs that entail the four independent variables that influence the dependent variable that was performance implementation was derived through a reliable regression model equation modelled as follows. $Y= \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4+ \varepsilon$. $Y= 0.477 + 0.281\ (X1) + 0.119(X2) + 0.320(X3) + 0.188(X4)$. The equation demonstrated that all the independent features demonstrated a positive impact on the executional impact of building and construction projects. The regression equation demonstrated a unit surge in environmental aspects, management features, cash flow features and variation of scope features would consequently lead to a positive rise of 0.298, 0.119, 0.320 and 0.188 correspondingly in implementation impact of building and construction projects in Kenya. The regression equation demonstrated that in the likely occurrence that all other factors constant (no elements or aspects) implementation impact of building and construction projects in Kenya would be 0.477. The null hypothesis H0 in the study was appropriately rejected and the alternative hypothesis retained (Osman et al.,2019).

Waiguru et al. (2021) conducted a study established that most politicians are available for project handover ceremonies in Counties but fail to appear thereafter. Many projects conducted within counties were led by political interests and not data or community needs (Waiguru et al.,2021).

Chang (2018) steered an important study on how global construction projects are momentously impacted by government spending. Global manufacturing initiatives have been tormented with dogmatic risks in the worldwide market. Organizations have

attempted to ascertain the victory of dogmatic risk management but the need arose for comprehension or understanding of the actual political risks. This study directed at reconnoitering the political risks in international manufacturing initiatives. The pilot political risk factors and paths were anticipated from the literature assessment in the study. A survey questionnaire was established to accrue political risk cases faced by Chinese construction initiatives conducting international construction initiatives and 264 effective cases were acknowledged and gauged for the study. Championing the confirmatory factor analysis (CFA) process, a total of six macro factors (Political stability, legislative, safety, economy performance, tolerance and business environment and two micro factors (limited exposure and capability of organizations were acknowledged. The results of path analysis demonstrated that seven factors (macro) had the significant direct negative effect on risk and three factors (political, economic and tolerance) had the indirect negative effect on risk The findings from this study help specialists gain an in-depth appreciativeness of political risks in international construction projects and provide a beneficial mention for global initiatives to manage political risks when submitting outside the countries. The global market governments spend astronomical amounts on infrastructure leading to an increase demand for construction services. This has led to a higher need for skilled labor force opening up the job market for casual employees. The USA spends billions of dollars annually on construction of public buildings with a large number of these being health facilities. Covid 19 global pandemic brought up lockdowns that negatively affected the construction industry globally. The British government creatively came up with extensive infrastructure

spending diplomacies hoping to enhance the ailing industry in the short and long term periods (Chang et al., 2018).

According to El Hadj (2018), Africa has a unique set of market dynamics that deserve a keen eye and a different outlook. Consideration of key stakeholders and players in the housing industry and delivery value chain is of great value. Changeovers in leadership and correctness of payments of contracts were acknowledged as significant challenges to project completion in several construction projects. The incentive value chain and induced outcomes including decent and affordable housing play a key role. This therefore indicates that the political class must focus on informal settlements, housing finance, land, unique construction needs and urbanization (Bah et al., 2018)

The international perspective demonstrates that socio economic factors interrogate the facets of means of support within a given population. Socio economic factors need to be incorporated appropriately for a construction project to be successful within the set parameters and quality. Community participation is essential for the success of construction projects since people own the work they are involved in. The building of health facilities and learning institutions is essentially a community led responsibility and duty that leads to more ownership by the populace (Bucăţa & Rizescu, 2019). Khahro et al. (2023) illustrated that lack of skilled man power and raw materials were key social factors having an impact on construction completion in Pakistan. Moreover, poverty was a contributing barrier to lack of completion of projects. The study identified key barriers facing construction in the developing world (Khahro et al., 2023). Erick et al. (2019) through a study done at the Kenya National Highways authority (KNHA) revealed that

projects that had adequate raw materials and skilled manpower were more likely to be completed (Erick et al.,2019). Mavetera (2019) steered a study to evaluate the power of socio-economic factors on the construction sector in South Africa. The study incorporated both qualitative and quantitative approaches. The performance of a building project is a key determinant of its ultimate accomplishment. The failure of a construction project can be attributed to a variety of aspects. Among success factors, long-term sustainability of projects has been identified as a crucial mitigant. Studies have demonstrated that social and economic contemplations play a sizable effect in project completion. Pakistani construction developments tend to lack an organized basis for determining the bearing of social and economic elements on project accomplishment. This mandated the study to determine social and economic elements and their impact on project performance measures. Twenty nine experts representing clients, mentors and contractors were quizzed and the factors relevant to Pakistan were shortlisted based on interviews. SPSS software was used to analyze the data, and the results were presented in tables and graphs. Wellbeing, land value, health, occupation, and education were the top five social factors, while the top five economic factors were productivity, employment, transference, market access, and local market. As project performance indicators, time, patron satisfaction, cost, health and safety, and quality were identified. A questionnaire was designed using the prior information and data from 154 valid replies were gathered and analyzed using the linear multiple regression approach. These equations were constructed to examine the impact of social and economic factors on time, cost, health and safety, and quality. The research findings will help experts better understand how social and economic aspects affect project outcomes and raise industry standards. These

data will be useful to the project manager in formulating a comprehensive project management strategy and enhancing project results. The role of skilled labor was found to have a positive impact on the completion of projects. The study recommended the need of adequate supervision by all relevant departments Including public works (Mavetera et al.,2019). Ojiambo (2019) directed a study to evaluate the level to which social economic factors affect completion of construction in public schools in Bungoma, Kenya. Purposive sampling technique was adopted. A sample of 461 respondents was derived. The respondents were school heads and parents. The study identified key socio-economic factors including low skill levels, fraud and low integrity, lack of community participation. The study made relevant recommendations including skill training for the community as well as strengthening public participation (Ojiambo et al., 2019). Kihoro (2020) conducted a study analyzing the factors affecting outcomes of construction projects in Nairobi, Kenya. The study assesses timely completion and cost effectiveness. The study was an analytic survey. The findings demonstrated that the Kenyan construction sector was affected by the lack of adequate resources and skilled manpower for completion (Kihoro, 2020).

The global perspective revealed that technology and computerization are emerging necessities of the modern construction industry. Studies done in America and Japan verified that the use for technology in the project design process is an essential precept for most modern constructions. Internet connectivity is essential for any modern project (Chen et., 2020). Chen (2020) analyzed the impression of contemporary algorithms in construction projects in China. The study targeted large assembly firms in the capital. Technology and automation are known as emerging necessities of the modern

construction industry. The study emanated from curiosity in contemporary construction approaches and newfangled technologies. Creation companies globally are determining how to embrace new ideas and engage with new approaches to simplify the overall process. A lot of momentous toil has gone into reconnoitering the use of individual know-hows in the construction sector. However, there is no all-inclusive comprehension of new and emerging technologies that has momentous benefits for construction projects. A systematic review approach was used in exposure of evidence. A total of 175 articles published between the years of 2001 and 2020 were recognized and systematically reviewed. Twenty six technologies were acknowledged and were pigeon-holed into five groups in terms of functionality in construction development progression. The processes included acquisition of data, analytics, visualization, communication and design process automation. Digital technologies for data acquisition and visualization seem to buttress and enable revolution in many aspects of construction. Enhancements in work efficiency health and safety, efficiency, quality and sustainability have been mentioned as being the key benefits of using these know-hows. Building information modelling (BIM) seems to be the single most commonly used technology thus far. The findings from this review would be of utmost benefit to construction practitioners including consultants and project managers to identify the types of technologies that can be executed in different stages of construction developments to achieve desired results, and thus, make appropriate decisions on technology ventures and adoption. The study demonstrated that the use for technology in the project design is essential. Internet connectivity is essential for any modern project. Social media is essential for construction companies as an advertisement and connecting tool(Chen et al., 2020).

Abeysingye (2022) analyzed the impact of technological factors on completion of construction projects in Sri Lanka. Thirty nine factors were identified after interrogating 163 construction Engineers. Timely completion is an important factor for the triumph of a construction project, particularly in the Sri Lankan situation. This study aimed to identify the most influential factors that affect the timely completion of construction developments in Sri Lanka. Thirty-nine factors were identified through an inclusive literature review and experts' thoughts. A questionnaire combining the 39 project delay factors was circulated among 163 Civil Engineers, and responses were attained. Random sampling method was utilized to select the sample. The Relative Importance Index (RII) scrutinized and tiered the project delay factors. The top ranked noteworthy project delay factors were identified as dearth of skilled subcontractors/providers, deficiency of drudges (Skilled, semi-skilled, unskilled), financial hitches of contractors, delay in transporting materials to the setting and Covid-19 pandemic state of affairs. According to the main three respondent types that encompassed customers, contractors and consultants, the contractor related factors were the crucial group among others that interrupt a construction project. The methodical assessment of the study encompassed supporting the Sri Lankan construction industry to catalog the features affecting the timely completion of construction projects and emerging mitigation systems and approaches. The key stakeholders could schedule the construction work in an orderly manner by identifying areas that need more consideration. The contribution of this study would be of utmost benefit to stakeholders to adopt a proactive approach by recognizing mistakes and reducing potential issues that lead to construction project delays in Sri Lanka. The crucial

role for capacity building and oversight, particularly on technology use in construction was highlighted (Abeysingye.,2022).

Aiyetan (2022) conducted an evaluation of mega projects in South Africa to evaluate the role and use of technology in the construction process. Mega-projects, particularly for the expansion of infrastructure, are being commenced increasingly in many developing countries. Mega-projects are highly intricate and involve significant construction goings-on. However, mega-projects in Africa face grave challenges of delay and cost plunders because of their nature and the complexities involved. Therefore, using the context of mega-projects in South Africa and stakeholders' acuities, the aspects that affect assembly and approaches that would alleviate the challenges and improve construction management at sites were scrutinized in this study. Factor analysis and ordinal regression modelling were used to scrutinize data gained from a survey conducted among participants. Findings suggested that five principal components and associated factors, including participants, plant and machinery, productivity, personnel and materials suggestively affect construction during mega-projects. Further, eight approaches that are aligned to stakeholder rendezvous, plants and machinery, productivity, human assets and materials are likely to expand construction management at sites of mega-projects in South Africa. The four most imperative approaches include making the availability of competent workforces for plant and machinery procedure and maintenance, effective command and observing, the adoption of proper stakeholder engagement systems and ensuring clear and effective commitment, and the implementation of an advanced and effective communiqué system. Further strategies, such as the documentation of stakeholders and mutual goals and procurement and use of forward-thinking and quality

plant and machinery, including the use of robotics and automation could progress construction at sites. Similarly, approaches such as ensuring availability of satisfactory and quality material and administration of the site for effective accessibility and operation, although likely to have reduced influence could also progress construction at sites of mega-projects. Ordinal regression modeling incorporated factor analysis to gauge data. The findings demonstrated that inadequate use of technology occurred and constantly led to delays and cost overruns. The study recommended early utilization of technology and observing during the process. The study demonstrated that an advanced and effective communiqué arrangement has been acknowledged as a key approach with forecasting being on the use of robotics and automation. This is projected to improve overall construction eminence. The use of technology continues to be essential with the growth of mega-projects (Aiyetan & Das, 2022).

1.2.1 External Factors

External factors are factors that act as extrinsic influencers to the project itself which include political factors, economic factors, social factors and technology. Political factors refer to decision and laws that are influenced by government officials. These factors include government policies, leadership transition, legal hurdles and political trends. Project managers should possess both technical and organizational skills. One decisive technique is the ability to apprehend the external environment where the project domiciles. This entails understanding the organization and the political climate, the team and the leadership capability. Projects commonly flop due to a development manager's distraction from the political atmosphere, indisposition to react correctly to the milieu, inability to transact with an unruly crew and interactive concerns.

Soft skills of development running are burdensome to master but great chattels to own. Comprehending the political landscape and antedating political variation is crucial for the success of a project. A consideration of the political climate is essential for a project manager to stimulate candid and genuine relationships with the project team, to leverage leadership skills, team synergy and political goodwill for project success (Irwin, 2007). Social aspects which contain demographics and ethos can affect the environment of any organization or project by prompting decisive adoptions. Social factors can include demographics, broadcasting, ethos and communal reception (Nyamwange, 2018).Fiscal factors entail pecuniary growth, interest tariffs, exchange tolls, price rises and income rates, minimum remuneration, salaried hours, redundancy, credit availability and cost of livelihood**.**

These factors influence an economy's performance with directly impact on a company. Construction production rises as a result of increased economic activity in most major towns. Economic activity has transitioned from developed to developing countries. Economic factors are further compounded by rapid expansion, competition and fast evolution of the development sector. The past saw measures of construction performance such as profit, income and return on investment. Developing countries are overly taxed since construction is seen as luxury not as need. Economic factors commonly affecting projects include interest rates, jobs, taxes, laws and legislation. Inadequate budgetary and time forecasting leads to poor performance. Proper education enables people to grow leading to economic growth and skill development. This promotes employment and economic growth. Economic factors in underdeveloped or developing countries play a key role that needs further investigation to provide knowledge(Khahro et al., 2023).

The most common environmental factors affecting projects include weather conditions including rains, floods, impassable roads and poor access to the location. According to Akanni et al (2015) a study done in Nigeria further established the role of an environment that is conducive for a successful project. Community acceptance and appreciation was an important factor for the successful completion of projects (Akanni et al., 2015).

Technology advancement is the key aspect of industry 4.0 or the fourth industrial revolution. Technological factors may include collaboration tools which make it easy to connect with the team. Time tracking software saves time and money. The presence of analytic features assists in forecasting on future decisions. The role of technology in developing countries is a key challenge that may be a hindrance to completion of key projects that commence particularly in the government projects(Zorić et al., 2021).

1.2.2 Completion of construction projects

Construction completion refers to the work specified in the Contract reaching an agreed finale, apart from the work required during the period of assurance, in harmony with the provisions and plans and accepted by the client division. The three main stages include practical completion, works completion and final completion within the construction period. Practical completion refers to the point where the contractor confirms that the project has achieved practical completion as per the contract by giving a certificate to this effect. Sometimes this is only based on the professional judgment of the contractor. Works completion means that the design and delivery of the project is concurrent with the object of the agreement and as per the requirements of the contracting authority. Final completion means that a project as met the requirements as per the

warranty period including being inspected and repaired of any defect within the contract period. Once the contractor attains final completion he still retains certain obligations in relation to the latent defects liability period. A completed project must be commissioned or ready for commissioning after fulfilling all the requirements (Rwingo & James, 2021).

The Makueni County retains 10% of payment till 6 months after completion. This amount is only released once any defects occurring within six months of completion are fully repaired. Globally, countries including Indonesia, Canada, Australia, Russia, the US, China and India account for 65 per cent of about $4.5 trillion increase in global construction productivity in the last decade. In the year 2010, infrastructure provision accounted for 32 per cent of global construction output. Residential and non-residential sectors accounted for approximately 68 per cent of the global output. The period between 2015 to 2020 achieved rates of economic growth between 5.6–5.7 per cent per annum(Timilsina et al., 2023). According to Gashaahun et al (2020), the time for the performance of a construction project is the core predictor and promoter of the construction industry. Construction delay is a key hindrance to the project objectives in Africa. The factors established as barriers to project completion in this study included differing client variations, poor project planning, and delay in change approval, poor site investigation, and lack of adequate resources, change in material prices, poor communication and adverse weather conditions. Time and cost underestimation with poor quality of construction caused most of the delays. The recommendations included appropriate choice of competent consultants, design teams, contractors, and suppliers. Stakeholder involvement at the planning stage is essential. Efficient communication and

appropriate legislation are relevant mitigation mechanisms to prevent the delay of African construction projects(Gashaahun, 2020).

A study done by Nyamwange et al (2018) established that budgeting, staff reliability, monitoring and evaluation had a positive impact on the completion of construction projects at the Kenya Airports Authority. Contract changes negatively impacted the completion of projects. Budget plans and budget control processes were proposed in the planning process. Training programs were proposed to capacity build the project teams. The teams should be recruited based on prior experience and proven competency(Nyamwange, 2018).

Devolution has seen a significant rise in construction projects in Kenya and Makueni County specifically. The performance of the projects is marred with political and economic challenges. According to Rwingo et al (2021) Makueni County has experienced delays in several construction projects since the onset of devolution. Both internal and external factors play a critical role in delays. Governance plays a key role in delays in completion of construction projects. Resource risk management in Makueni County was generally commendable. Lack of adequate finances was a key hindrance. The risk of legal clearance was also high. The need for appropriate budgeting and financial control was reiterated(Rwingo & James, 2021).

1.2.3 Departments of Health in Counties within Kenya

Globally, the World Health organization is the key body governing health policy. The uniformity of key issues is essential whenever health care is concerned. The body ensures that all issues and matters concerning health are incorporated in an ethical and just

manner (Chen et al., 2020). The African continent heavily relies on health guidelines as dictated by the World Health Organization. Guidelines provided by the World Health Organization were used globally and in Africa during the Covid 19 pandemic. Universal Health access for all is a key output that the organization envisions. The issues concerning development in most African countries are left to the discretion of individual states (Ly et al., 2022).

The Ministry of Health in Kenya is the Umbrella body that oversees all functions around health in the country. The technical lead of the Ministry of Health is the Cabinet Secretary. The Cabinet Secretary is deputized by the Principal Secretary that is deputized by the Director of Medical Services. There are various deputy directors heading different directories. Healthcare was devolved in 2013 with the transition to a new Government. The functions of the National Government in health care transitioned to the counties with counties taking up the responsibility of conducting developmental projects. The transition was envisioned as a key step towards achieving development in regions that were previously left behind. The National Government partnered with the World Bank and the Danish International Development Agency (DANIDA) that support development functions in Health Centers and Dispensaries within counties (Kairu et al., 2021).

According to Moses Mark (2021), each of the 47 counties has a department of Health. Each of this Department is represented in the County Assembly by an Executive Committee Member (ECM). The Chief Officer of Health is the Accounting Officer of the Department. The Chief Officer is deputized by three Directors. The Directors lead the Directorate of Health Planning, the Directorate of Clinical Services and the Directorate of Health Products and Technologies. The process of devolution enabled Counties to

independently manage facilities and make key decisions on developmental activities within the counties (Moses et al., 2021). Several key policies govern all government projects at the National and County level. The Public Participation Act of 2019 ensures that all Government projects within Counties are subjected to public scrutiny before initiation.

1.2.4 Department of Health in Makueni County

According to Moses Mark (2021), each of the 47 counties has a department of Health. Each of this Department is represented in the County Assembly by an Executive Committee Member (ECM). The Chief Officer of Health is the Accounting Officer of the Department. The Chief Officer is Deputized by three Directors. The Directors lead the Directorate of Health Planning, the Directorate of Clinical Services and the Directorate of Health Products and Technologies. The process of devolution enabled Counties to independently manage facilities and make key decisions on developmental activities within the counties (Moses et al., 2021).

The Health Department in Makueni County is represented in the County Assembly by the Executive Committee Member. The Chief Officer of Health is the Accounting Officer of the Department. The Chief Officer is deputized by three Directors. The Directors lead the Directorate of Health Planning, the Directorate of Clinical Services and the Directorate of Health Products and Technologies. Makueni County has six sub counties. These are Makueni Sub-county, Kibwezi East, Kibwezi West, Kilome, Kaiti and Mbooni. Each of the six Sub Counties is headed by a Sub-county MOH that is in charge of all Health Centers and Dispensaries within the Sub-county.

1.2.5 Projects in the Department of Health in Makueni County

Projects within the facilities are coordinated by Health Facility Project Management Committees. The Facility manager acts as the secretary of the committee. The chairman is appointed by the ECM while two members are elected. Technical support is provided by the County Quantity Surveyor and the County Engineer (Makueni County Health Policy, 2022). The team oversees construction projects within the county. These include construction of roads, boreholes, dams, buildings and market places. The health projects include construction of wards, outpatient departments, incinerators, boreholes fences and gates within the hospitals. The project management committee is accountable to the project and gets an allowance of 2% of the project cost. The same committee also approves the payment of retention fees to contractors after satisfaction of works done. The management of health facilities depends on the level of facility. Hospitals are managed by doctors, health centers by clinical officers and dispensaries by nursing officers. The Makueni County Facility Improvement Fund Act (2016) grants Financial Autonomy to individual Facilities. This act ensures that facilities are given the autonomy of making the decisions on how appropriate the resources generated by the facilities ought to be used (Makueni County Government Website, 2023).

1.3 Statement of the problem

The international image of construction demonstrates that project interruptions and lack of achievement have had a deleterious bearing on the general resource basket,

infrastructural completion as well as major service delivery in organizations (Vasugi et al., 2018). Sub Saharan Africa has experienced significant deleterious effect owed to service delays particularly in essential services whenever projects stall or fail to take off (Gashaahun, 2020). Many studies have been done on organizational factors hindering completion of construction projects while the role of external factors remains largely unverified (Moses et al., 2021). Beyene (2023) directed an important study investigating the impact of political factors on completion of construction project in Addis Ababa, Ethiopia. The bulk of the construction projects worked on in Addis Ababa city experienced various degrees or magnitudes of time clogging in which the projects delayed in their completion. The top four most influential factors identified were reluctance of specialists, inaccurate guesstimate of contract duration, delay in consents and late verdict making, and slow organization of labor whereas inadequacy of billed funds, low inspiration, and absence of enticements to contractors were the three least significant causes identified. To limit the adverse impact of the factors, the application of a comprehensive work breakdown structure, proper duty assignment, earned value belief, and project software were proposed as mitigation measures to be implemented. The finding of the study will shake the key experts and practitioners engaging in the city's construction industry to focus on managing the severe factors. The study entailed a survey of 11 respondents who practiced actively in the construction industry. Changes in leadership during elections were a significant factor. Lack of continuity after elections meant that white elephant projects remained unfinished. Delay in payment of contracts to stalling of major construction projects including hospitals and schools. Transitions in leadership and timeliness of payments of contracts were identified as significant

challenges to project completion in several construction projects (Beyene, 2023). Mavetera (2019) conducted a study to evaluate the impact of socio-economic factors on the construction sector in South Africa. The study utilized both qualitative and quantitative methodology. The role of skilled manual labor was found to have a positive bearing on the completion of construction projects. The study recommended the need of adequate supervision by all relevant departments including public works (Mavetera et al.,2019). Abeysingye (2022) scrutinized the impression of technological factors on completion of construction projects in Sri Lanka. Thirty nine factors were identified after interviewing 163 construction Engineers. The engineers were acknowledged after random sampling method. Skilled worker shortage was the main hindrance. Poor internet connectivity was also highlighted. Inadequate utilization of technology in the design process was a significant challenge. The need for capacity building and oversight, particularly on technology use in construction was highlighted (Abeysingye.,2022).

Makueni County has faced challenges in completion of projects in the health department. The department has streamlined the organizational factors including having a project management committee and ensuring the committee follows up the project from inception to completion. Unfortunately, many projects remain uncompleted long after the projected deadlines. Incomplete projects mean that patient care is affected. Many incomplete facilities have to refer patients to other nearby facilities. This leads to an overwhelmed workforce and hampers quality of care. It is against this background that this study sought to establish the effect of external factors on completion of construction projects in the department of Health, Makueni County.

1.4 Purpose of the study

Purpose of the study was to establish the effect of external factors on completion of construction projects at the department of health, Makueni County. The study findings will be relevant to the departments of health within counties as well as the academic scholars pursuing similar research areas.

1.5 Objectives of the Study

The study contained a general objective and specific objectives.

1.5.1 Main Objective

The main objective of this study was to determine the effect of external factors on completion of construction projects at the department of health, Makueni County, Kenya.

1.5.2 Specific Objective

The specific objectives of this study were as follows:

i. To assess the effect of political factors on completion of construction projects at the department of health, Makueni County, Kenya.

ii. To determine the effect of socio-economic factors on completion of construction projects at the department of health, Makueni County, Kenya.

iii. To establish the effect of technology on construction projects at the department of health, Makueni County, Kenya.

1.6 Research Hypothesis

This study sought to test the following hypothesis:

a. **H_{01}**. There is no significant relationship between political factors and completion of construction projects at the department of health, Makueni County, Kenya.
b. **H_{02}**. There is no significant relationship between socio-economic factors and completion of construction projects at the department of health, Makueni County, Kenya.
c. **H_{03}**. There is no significant relationship between technology and completion of construction projects at the department of health, Makueni County, Kenya.

1.7 Significance of the Study

The research project will beneficial to the departmental leadership. The evidence will guide the planning and monitoring process of all construction projects. Projects will be completed on time by mitigating any external barriers. The evidence will be beneficial to the academic world by providing local data that is currently unavailable on external factors and completion of construction projects. The study will highlight recommendations that will be useful to scholars that intend to identify research areas and gaps for further studies.

1.8 Scope of the Study

This study focused on the projects in the department of Health in Makueni County. Makueni County has six sub counties which are Makueni, Kibwezi East, Kibwezi West, Kilome, Kaiti and Mbooni. The study targeted all the health department projects in

Government facilities in Makueni County initiated in financial years 2021/2022 and 2022/2023.

1.9 Delimitations of the Study

The research study was delimited to Government Health facilities, in Makueni County. The study investigated the effect of external factors on project completion. Internal factors will not be investigated. The data collected was controlled with respect to the distinctiveness of Makueni County and not generalizing and comparing it to other counties, the continent or the world.

1.10 Limitations of the Study

The respondents were managers of health facilities hence scheduling will be essential. The researcher ensured convenience in availing the questionnaires to the facility managers. The questionnaire incorporated closed ended approach. The researcher also assured respondents of confidentiality in responses. No names were recorded to ensure that respondents are as honest as possible.

Makueni County is vast and accessing some respondents may be challenging. The researcher overcame this by attending the monthly meetings held for all facility managers at a common venue.

1.11 Assumptions of the study

The study was done on the assumption that there is a relationship between or influence of study variables, political factors, socio-economic factors, technological factors and

construction project completion. Respondents were assumed to be honest in responding to questions asked.

1.12 Theoretical Framework

Completion of construction projects experiences many challenges that are either intrinsic or extrinsic in nature. Extrinsic factors play a big role in the failure of completion of construction projects. The extrinsic factors include political factors, technological factors, environmental factors and socio economic factors (Zorić et al., 2021). There are a number of theories that can correlate the relationship between external project factors and completion of construction projects. The two that best suite this comparison are the Theory of Constraints (Eliyahu G., 1984) and the Socio-Technical systems Theory (Walker and Stanton (2008)).

1.12.1 Theory of constraints

Eliyahu Goldratt was the originator of the Theory of Constraints (TOC) through the 1984 novel, “The Goal”. It is now widely referenced in project management. It identifies the limiting factor also called the constraint that impedes achieving a goal. Thereafter, it implies that overcoming the constraint means that it is no longer the limiting factor. The constraint can also be referred to as bottlenecks. The Theory hypothesizes that every system in complexity, including the construction process has multiple linked activities some acting as constraints upon the entire system. The relevance to this study is that the external project factors, namely political, socio economic and technological can act as bottlenecks to the entire construction process. The Theory of Constraints in this regard means that overcoming these powerful forces as barriers will inevitably improve the

entire construction process and assist the project manager achieve the overall goal(Rota et al., 2021). Political involvement, delay in contract payments and transitions in leadership can cause the delay or stalling of projects. Socio economic factors including lack of skilled labor or inadequate raw materials can cause the stalling of projects. The absence of internet connectivity or the lack of adequate use of technology can lead to incomplete construction projects.

This theory was expected to demonstrate to what extent political factors including political involvement, contract payments and transitions in power affect completion of construction projects. This theory also assessed the extent to which socio-economic factors like availability of skilled labor and raw materials affect completion of construction projects.

1.12.2 Resource Dependence Theory

According to Pfeffer and Salancik (1978), the resource dependence theory explains how the behavior of organizations is affected by the external resources in possession. These organizations transform and negotiate with the external environment so as to acquire sufficient resources to exist and flourish. The theory heavily depends on transactions with other players and establishments within the external environment so as to acquire resources. The only catch in this relationship is overreliance on the external environment. This theory rightfully fit in this study since the construction projects rely on a reliable external environment for completion. The presence of political goodwill means a project will progress unhinged. The availability of technological support means a project will meet quality and time requirements. The resources availed by a conductive

external environment promote the success and efficiency of the project overall, Resources that are scarce delay the completion of construction projects. Strategies including political lobbying by the community increase the organization's portfolio and support, strengthening and developing links to other partners(Akram & Abrar Ul Haq, 2022).

This theory is relevant to this study as it assessed the extent to which socio-economic factors including raw material availability and skilled labor availability influence completion of construction projects. The availability of adequate raw materials is essential for the completion of projects. The same case applies for the availability of skilled labor and workforce. Lack of any of the essential socio-economic resources which are actually independent variables will inevitably lead to delays or lack of completion of projects. The role of risk mitigation and risk arrest at early steps come in here. The theory was also rightfully assessed by the link between technological factors including internet connectivity and completion of construction projects. The presence of internet as a key resource was measured to assess the effect on completion of projects. The use of internet in the design process was also measured and assessed to determine the exact effect on completion of construction projects. The theory of resources was not applicable to political factors since these factors are not necessarily resources. The only factor applicable to this theory among the political factors was contract payments. The payment of contracts was also assessed to determine whether it affected the completion of projects. The financial resource was related to motivation of contractors in the process of completion of projects.

The theory of resource dependence was therefore considered appropriate for this study.

1.12.3 Socio-Technical systems Theory

According to Walker and Stanton (2008), the Socio-technical theory implies that the design and performance of any organisational system can only be assumed and enhanced if the social and technical aspects are interlinked and treated as correlated parts of a bigger system. The theory heavily depends on transactions with other players and establishments within the external environment so as to acquire resources. The only catch in this relationship is overreliance on the external environment. This theory rightfully fit in this study since the construction projects rely on a reliable external environment for completion. The presence of political goodwill means a project will progress unhinged. The availability of technological support means a project will meet quality and time requirements. The resources availed by a conductive external environment promote the success and efficiency of the project overall, Resources that are scarce delay the completion of construction projects. Strategies including political lobbying by the community increase the organization's portfolio and support, strengthening and developing links to other partners(Akram & Abrar Ul Haq, 2022).

This theory assessed the extent to which socio-economic factors including raw material availability and skilled labor availability influence completion of construction projects. The theory was also rightfully assessed by the link between technological factors including internet connectivity and completion of construction projects.

1.13 Conceptual framework

Conceptual framework is a useful tool explaining the concept of the study including its solicitation and relevance in the study (Khan, 2008). The variables were grouped into dependent and independent. The independent variables in this study were political factors, socio economic factors, technological factors and environmental factors while the dependent variable was completion of project. The figure below shows the relationship between the four independent variables and the dependent variable.

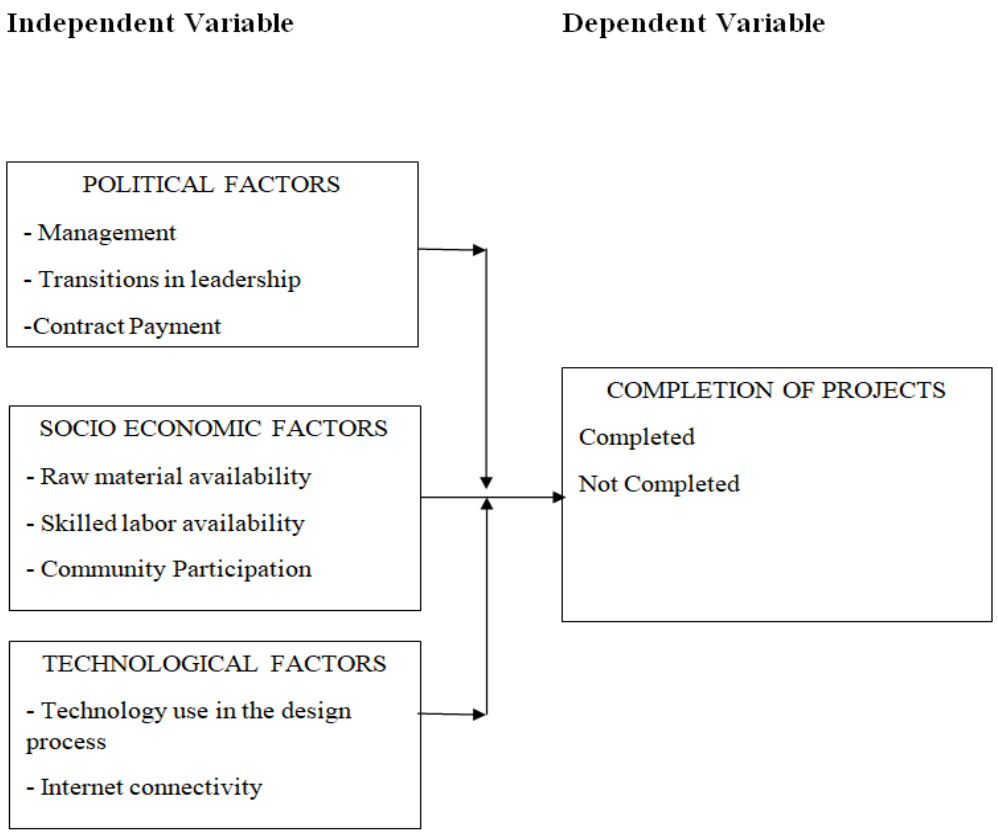


Figure 1.0: Conceptual Framework (Source: Journal of Construction and Project Management 2021)

The variables were grouped into dependent and independent. The independent variables in this study were external factors. These include political factors, socio

economic factors, technological factors and environmental factors. Each of these factors can lead to completion or lack of completion of construction projects. Completion of projects is therefore the dependent variable. The independent variables are broken further down as demonstrated in the figure above (Akram & Abrar Ul Haq, 2022).

CHAPTER TWO:

LITERATURE REVIEW

2.1 Introduction

This section discusses the evidence from studies on the effect of external factors on the completion of construction projects. The literature discusses the available evidence on how construction completion was affected by political factors, socio economic factors, environmental factors and technological factors.

2.2. Empirical Review

This section involved an evaluation of previous studies done and an in-depth consideration of the study variables and to what extent they affected the completion of construction projects. The variables included political factors, socio-economic factors and technological factors.

2.2.1 Effect of political factors on completion of construction projects

Beyene (2023) directed an important study investigating the impact of political factors on completion of construction project in Addis Ababa, Ethiopia. The bulk of the construction projects worked on in Addis Ababa city experienced various degrees or magnitudes of time clogging in which the projects delayed in their completion. Following the different problems encountered during the developmental stages such as inception, design, and implementation phases, the projects were exposed to unforeseen time overruns compromising overall performance of the projects. This led to the general

resolve to detect the actual causes of adjournment so as to diminish or disprove the corresponding adverse controls. This study primarily expected to be investigating and analyzing the potential factors causing venture time teeming in the city so that the imperative factors can be identified and the applicable remedial measures can possibly be forwarded. The role of data collection, the study applied a semi-structured questionnaire survey. The questionnaire was distributed to 121 respondents encompassing practitioners and experts actively working in the construction industry. Fifty-four significant barring factors were identified and grouped under ten categories according to the similarity of their origin. In order to identify the most noteworthy factors, severity investigation based on the principle of relative importance index was carried out. Therefore, the top most significant and least significant factors were identified. The top four most influential factors identified were reluctance of specialists, inaccurate guesstimate of contract duration, delay in consents and late verdict making, and slow organization of labor whereas inadequacy of billed funds, low inspiration, and absence of enticements to contractors were the three least significant causes identified. To limit the adverse impact of the factors, the application of a comprehensive work breakdown structure, proper duty assignment, earned value belief, and project software were proposed as mitigation measures to be implemented. The finding of the study will shake the key experts and practitioners engaging in the city's construction industry to focus on managing the severe factors. The study entailed a survey of 11 respondents who practiced actively in the construction industry. Changes in leadership during elections were a significant factor. Lack of continuity after elections meant that white elephant projects remained unfinished. Delay in payment of contracts to stalling of major construction projects including

hospitals and schools. Transitions in leadership and timeliness of payments of contracts were identified as significant challenges to project completion in several construction projects (Beyene, 2023).

Moses et al (2019) directed an important study to explore the effect of micro and macro environment on implementation of relevant partnerships in the construction industry in Kenya. The study gauged the political backdrops and the dexterity level within the public segment. The study was an analytic cross-sectional survey in context. The population entailed three public private partnerships in the country. A sample size of 31 projects was acquired by use of a sample frame. Several important studies have been done in Kenya on the influence of politics on construction projects with a keen interest on the local contexts. The study dogged that lack of governmental goodwill will have an equivalent impact on the completion of construction projects. The Kenyan electoral process as well as African processes are infamous for leading to filibustering of projects, be they constructions or otherwise. County governments have experienced varios challenges consequent to poor planning. Local county governments experience prevaricating of construction projects countrywide. According to Moses, K et al ((2019) Public Private Partnership (PPP) can be defined as long term agreements between the Governments in play and the private sector. There is a great deficit of goal oriented partnerships in Kenya. The private sector cushions the public from risks due to a financial/asset base. The two sectors share the rewards. A conducive sector for the private sector will spur economic growth. Organizations in Kenya have recently grown interested in PPP following devolution and the growth of counties. Business people in Kenya still report a harsh political environment. Corruption in Kenya has been linked to failure of

PPPs. Ease of access to government tenders is riddled with corruption and bribes. African countries experiencing political instability tend to lag behind in construction development (Baithili et al., 2019). Apportionment of government propositions to cronies by legislators has been a spine in the flesh of many prospective developers. Postponement in payment of contracts is a mutual challenge in the county governments that are still grappling to prove that devolution was geared towards betterment of the populace. Health projects are some of the projects that are commonly affected with many county officers working in the department (Moses et al., 2021).

Osman et al (2019) directed an important study evaluating features affecting the completion of construction projects in Mombasa, Kenya. The study aimed to gauge how external factors sway project implementation performance in building construction projects in Kenya and also to assess how leadership factors affect completion of projects. The study sought to interrogate how cash flow factors sway project implementation performance in building construction projects in Kenya, and to observe how variation of the project latitude impacts project implementation performance in building construction projects in Kenya. The target was a total of 220 respondents. This led to a sample size of 33 respondents that was derived by appropriate equations. The sample size entailed government serving organizations, consultant organizations and contractors in the vicinity of Mombasa County. Data was collected by use of questionnaires. Descriptive statistics used in data analysis by the reliance of statistical packages for social sciences (SPSS). Data arrangement entailed frequency tallies, percentages, mean and standard deviation. Testing of the hypothesis was done using the rightfully fitting chi-square test due to the appropriateness with the study. The study derived that variation of scope

factors, Cash flows features, Leadership aspects and Environmental aspects were significant all with a level of 0.000 when assessed for a relationship with project implementation performance. The beta coefficients of constructs that entail the four independent variables that influence the dependent variable that was performance implementation was derived through a reliable regression model equation modelled as follows. $Y= \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4+ \varepsilon$. $Y= 0.477 + 0.281\ (X1) + 0.119(X2) + 0.320(X3) + 0.188(X4)$. The equation demonstrated that all the independent features demonstrated a positive impact on the executional impact of building and construction projects. The regression equation demonstrated a unit surge in environmental aspects, management features, cash flow features and variation of scope features would consequently lead to a positive rise of 0.298, 0.119, 0.320 and 0.188 correspondingly in implementation impact of building and construction projects in Kenya. The regression equation demonstrated that in the likely occurrence that all other factors constant (no elements or aspects) implementation impact of building and construction projects in Kenya would be 0.477. The null hypothesis H0 in the study was appropriately rejected and the alternative hypothesis retained (Osman et al.,2019).

Waiguru et al. (2021) conducted a study on the effect of political factors on completion of rod projects in Laikipia County, Kenya. The study analyzed the effects of stakeholder mapping, political environment and political involvement on the projects. The study targeted 86 key stakeholders and interrogated 74 sampled stakeholders. Simple random sampling was used. 75 % of respondents reported that bureaucracy and political involvement had negative effect on project completion. The study established that most politicians are available for project handover ceremonies in Counties but fail to appear

thereafter. Many projects conducted within counties were led by political interests and not data or community needs. The researcher recommended further studies on contract payment delays as barriers to project completion (Waiguru et al., 2021).

Chang (2018) steered an important study on how global construction projects are momentously impacted by government spending. Global manufacturing initiatives have been tormented with dogmatic risks in the worldwide market. Organizations have attempted to ascertain the victory of dogmatic risk management but the need arose for comprehension or understanding of the actual political risks. This study directed at reconnoitering the political risks in international manufacturing initiatives. The pilot political risk factors and paths were anticipated from the literature assessment in the study. A survey questionnaire was established to accrue political risk cases faced by Chinese construction initiatives conducting international construction initiatives and 264 effective cases were acknowledged and gauged for the study. Championing the confirmatory factor analysis (CFA) process, a total of six macro factors (Political stability, legislative, safety, economy performance, tolerance and business environment and two micro factors (limited exposure and capability of organizations were acknowledged. The results of path analysis demonstrated that seven factors (macro) had the significant direct negative effect on risk and three factors (political, economic and tolerance) had the indirect negative effect on risk The findings from this study help specialists gain an in-depth appreciativeness of political risks in international construction projects and provide a beneficial mention for global initiatives to manage political risks when submitting outside the countries. The global market governments spend astronomical amounts on infrastructure leading to an increase demand for construction

services. This has led to a higher need for skilled labor force opening up the job market for casual employees. The USA spends billions of dollars annually on construction of public buildings with a large number of these being health facilities. Covid 19 global pandemic brought up lockdowns that negatively affected the construction industry globally. The British government creatively came up with extensive infrastructure spending diplomacies hoping to enhance the ailing industry in the short and long term periods (Chang et al., 2018).

According to El Hadj (2018), Africa has a unique set of market dynamics that deserve a keen eye and a different outlook. Consideration of key stakeholders and players in the housing industry and delivery value chain is of great value. Changeovers in leadership and correctness of payments of contracts were acknowledged as significant challenges to project completion in several construction projects. The incentive value chain and induced outcomes including decent and affordable housing play a key role. This therefore indicates that the political class must focus on informal settlements, housing finance, land, unique construction needs and urbanization (Bah et al., 2018)

2.2.2 Effect of socio-economic factors on completion of construction projects

Kharo (2023) directed a study evaluating the extent to which socio-economic factors affect the completion of construction projects in Pakistan. A sample of twenty nine expert respondents was gotten. The performance of a building project is a key element of its ultimate accomplishment. The failure of a construction project can be accredited to a variety of matters. Research has revealed that accomplishment and long-term sustainability are extremely critical. Social and economic considerations play a

considerable effect in project accomplishment. Pakistani construction projects have demonstrated that there is a lack of an orderly framework for measuring the impression of social and economic elements on project success. Therefore importance depends on determining social and economic elements and their impact on project performance measures. Twenty nine establishments representing clients, mentors and contractors were interrogated and the factors relevant to Pakistan were shortlisted based on interviews. SPSS software was used to investigate the data and the results were obtainable in tables and graphs. Wellbeing, land price, health, occupation and education were the top five social factors whereas the top five economic factors were efficiency, employment, conveyance, market access and indigenous market. The analysis of project performance indicators demonstrated that time, customer satisfaction, cost, health and safety, and quality were significant. Based on these characteristics, a questionnaire was considered and data from 154 valid replies was assembled and scrutinized using the linear multiple regression approach. The findings of the research can guide the government and other key stakeholders to better comprehend how social and economic aspects affect development outcomes and consequently improve industry standards. The data will be beneficial to the project manager in formulating a sound project management strategy and enhancing project results. Khahro et al. (2023) illustrated that lack of skilled manual labor and raw materials resources were key social factors having an impact on construction completion in Pakistan. Moreover, scarcity was a contributing factor to filibustering of projects. The study acknowledged key encounters facing construction in the developing world (Khahro et al., 2023).

Mavetera (2019) steered a study to evaluate the power of socio-economic factors on the construction sector in South Africa. The study incorporated both qualitative and quantitative approaches. The performance of a building project is a key determinant of its ultimate accomplishment. The failure of a construction project can be attributed to a variety of aspects. Among success factors, long-term sustainability of projects has been identified as a crucial mitigant. Studies have demonstrated that social and economic contemplations play a sizable effect in project completion. Pakistani construction developments tend to lack an organized basis for determining the bearing of social and economic elements on project accomplishment. This mandated the study to determine social and economic elements and their impact on project performance measures. Twenty nine experts representing clients, mentors and contractors were quizzed and the factors relevant to Pakistan were shortlisted based on interviews. SPSS software was used to analyze the data, and the results were presented in tables and graphs. Wellbeing, land value, health, occupation, and education were the top five social factors, while the top five economic factors were productivity, employment, transference, market access, and local market. As project performance indicators, time, patron satisfaction, cost, health and safety, and quality were identified. A questionnaire was designed using the prior information and data from 154 valid replies were gathered and analyzed using the linear multiple regression approach. These equations were constructed to examine the impact of social and economic factors on time, cost, health and safety, and quality. The research findings will help experts better understand how social and economic aspects affect project outcomes and raise industry standards. These data will be useful to the project manager in formulating a comprehensive project management strategy and enhancing

project results. The role of skilled manual labor was found to have a positive impact on the completion of projects. The study recommended the need of adequate supervision by all relevant departments Including public works (Mavetera et al.,2019)

Ojiambo (2019) directed a study to evaluate the level to which social economic factors affect completion of construction in public schools in Bungoma, Kenya. Purposive sampling technique was adopted. A sample of 461 respondents was derived. The respondents were school heads and parents. The study identified key socio-economic factors including low skill levels, corruption and low integrity, lack of community participation. The study made relevant recommendations including skill training for the community as well as strengthening public participation (Ojiambo et al., 2019).

Kihoro (2020) led a study investigating the factors affecting outcomes of construction projects in Nairobi, Kenya. The study assesses timely completion and cost effectiveness. The study was a analytic survey. The findings demonstrated that the Kenyan construction sector was affected by the lack of adequate resources and skilled manpower for completion (Kihoro, 2020).

2.2.3 Effect on technological factors and completion of construction projects

Chen (2020) analyzed the impression of contemporary algorithms in construction projects in China. The study targeted large assembly firms in the capital. Technology and automation are known as emerging necessities of the modern construction industry. The study emanated from curiosity in contemporary construction approaches and newfangled technologies. Creation companies globally are determining how to embrace new ideas and engage with new approaches to simplify the overall process. A lot of momentous toil

has gone into reconnoitering the use of individual know-hows in the construction sector. However, there is no all-inclusive comprehension of new and emerging technologies that has momentous benefits for construction projects. A systematic review approach was used in exposure of evidence. A total of 175 articles published between the years of 2001 and 2020 were recognized and systematically reviewed. Twenty six technologies were acknowledged and were pigeon-holed into five groups in terms of functionality in construction development progression. The processes included acquisition of data, analytics, visualization, communication and design process automation. Digital technologies for data acquisition and visualization seem to buttress and enable revolution in many aspects of construction. Enhancements in work efficiency health and safety, efficiency, quality and sustainability have been mentioned as being the key benefits of using these know-hows. Building information modelling (BIM) seems to be the single most commonly used technology thus far. The findings from this review would be of utmost benefit to construction practitioners including consultants and project managers to identify the types of technologies that can be executed in different stages of construction developments to achieve desired results, and thus, make appropriate decisions on technology ventures and adoption. The study demonstrated that the use for technology in the project design is essential. Internet connectivity is essential for any modern project. Social media is essential for construction companies as an advertisement and connecting tool(Chen et al., 2020).

Abeysingye (2022) analyzed the impact of technological factors on completion of construction projects in Sri Lanka. Thirty nine factors were identified after interrogating 163 construction Engineers. Timely completion is an important factor for the triumph of a

construction project, particularly in the Sri Lankan situation. This study aimed to identify the most influential factors that affect the timely completion of construction developments in Sri Lanka. Thirty-nine factors were identified through an inclusive literature review and experts' thoughts. A questionnaire combining the 39 project delay factors was circulated among 163 Civil Engineers, and responses were attained. Random sampling method was utilized to select the sample. The Relative Importance Index (RII) scrutinized and tiered the project delay factors. The top ranked noteworthy project delay factors were identified as dearth of skilled subcontractors/providers, deficiency of drudges (Skilled, semi-skilled, unskilled), financial hitches of contractors, delay in transporting materials to the setting and Covid-19 pandemic state of affairs. According to the main three respondent types that encompassed customers, contractors and consultants, the contractor related factors were the crucial group among others that interrupt a construction project. The methodical assessment of the study encompassed supporting the Sri Lankan construction industry to catalog the features affecting the timely completion of construction projects and emerging mitigation systems and approaches. The key stakeholders could schedule the construction work in an orderly manner by identifying areas that need more consideration. The contribution of this study would be of utmost benefit to stakeholders to adopt a proactive approach by recognizing mistakes and reducing potential issues that lead to construction project delays in Sri Lanka. The crucial role for capacity building and oversight, particularly on technology use in construction was highlighted (Abeysingye.,2022).

Aiyetan (2022) conducted an evaluation of mega projects in South Africa to evaluate the role and use of technology in the construction process. Mega-projects, particularly for

the expansion of infrastructure, are being commenced increasingly in many developing countries. Mega-projects are highly intricate and involve significant construction goings-on. However, mega-projects in Africa face grave challenges of delay and cost plunders because of their nature and the complexities involved. Therefore, using the context of mega-projects in South Africa and stakeholders' acuities, the aspects that affect assembly and approaches that would alleviate the challenges and improve construction management at sites were scrutinized in this study. Factor analysis and ordinal regression modelling were used to scrutinize data gained from a survey conducted among participants. Findings suggested that five principal components and associated factors, including participants, plant and machinery, productivity, personnel and materials suggestively affect construction during mega-projects. Further, eight approaches that are aligned to stakeholder rendezvous, plants and machinery, productivity, human assets and materials are likely to expand construction management at sites of mega-projects in South Africa. The four most imperative approaches include making the availability of competent workforces for plant and machinery procedure and maintenance, effective command and observing, the adoption of proper stakeholder engagement systems and ensuring clear and effective commitment, and the implementation of an advanced and effective communiqué system. Further strategies, such as the documentation of stakeholders and mutual goals and procurement and use of forward-thinking and quality plant and machinery, including the use of robotics and automation could progress construction at sites. Similarly, approaches such as ensuring availability of satisfactory and quality material and administration of the site for effective accessibility and operation, although likely to have reduced influence could also progress construction at

sites of mega-projects. Ordinal regression modeling incorporated factor analysis to gauge data. The findings demonstrated that inadequate use of technology occurred and constantly led to delays and cost overruns. The study recommended early utilization of technology and observing during the process. The study demonstrated that an advanced and effective communiqué arrangement has been acknowledged as a key approach with forecasting being on the use of robotics and automation. This is projected to improve overall construction eminence. The use of technology continues to be essential with the growth of mega-projects (Aiyetan & Das, 2022).

Table 2.1 Summary of Literature Review and Knowledge Gap

AUTHOR	AREA	FINDING	GAP IN RESEARCH
Beyene (2023)	A study analyzing the impact of political factors on completion of construction project in Addis Ababa, Ethiopia.	Changes in leadership during elections were a significant factor. Lack of continuity after elections meant that white elephant projects remained unfinished.	The study did not capture aspects of contract delays and the extent to which it affects completion of projects. The study was also not done on health departments.
Moses et al (2019)	A study to analyze the effect of micro	The study determined that lack of political goodwill will have a proportionate impact on the completion of	The study was notable to assess the effect of transitions in leadership on completion of construction projects.

	and macro environment on implementation of relevant partnerships in the construction industry in Kenya.	construction projects.	
Waiguru et al. (2021)	A study assessing the effect of political factors on project completion in Nairobi, Kenya.	The study established that most politicians are available for project handover ceremonies in Counties but fail to appear thereafter.	The study did not assess elements such as contract delays and transitions in leadership.
Kharo (2023)	A study assessing the extent to which socio-economic factors affect the completion of construction projects in	Lack of skilled labor was found to be a significant factor.	The study did not assess all socio-economic factors including access to raw materials.

	Pakistan.		
Ojiambo (2019)	A study to assess the extent to which social economic factors affect completion of construction in public schools in Bungoma, Kenya.	The study identified key socio-economic factors including low skill levels, corruption and low integrity, lack of community participation. The study made relevant recommendations including skill training for the community as well as strengthening public participation	The study did not explore significance of raw material availability
Chen (2020)	The study analyzed the impact of modern algorithms in construction projects in China.	The study demonstrated that the use for technology in the project design is essential. Internet connectivity is essential for any modern project.	The context was in the developed world and may not be representative of the Kenyan context.
Abeysingye (2022)	The study analyzed the impact of technological factors on completi	Skilled worker shortage was the main hindrance. Poor internet connectivity was also highlighted. Lack of use of technology in the design process was a significant challenge.	The context of the study was not in Sub Saharan Africa. The need for local data exists.

	on of construction projects in Sri Lanka.		
Aiyetan (2022)	An evaluation of mega projects in South Africa to evaluate the role and use of technology in the construction process.	The findings demonstrated inadequate use of technology that often led to delays and high costs.	The study assessed the use of technology in the design process but did not assess internet connectivity and the extent to which it affects completion of projects.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a detailed outlook of the methods that were utilized to collect the data and analyze it according to the objectives of this study. The components of the research methodology included the research design, sampling design, data collection methods and procedure, data analysis methods, target population and finally the research site which constituted the study population.

3.2 Research Design

Manula et al. (2021) elaborated that research design refers to the framework of research methods and techniques identified by a researcher to carry out an appropriate study. It enables the researchers to streamline the research methods appropriate to the subject matter (Manula et al.,2021). Cross sectional analytic study approach was utilized in this study. According to Manjunatha (2019), analytic research encompasses the state at present with the researcher having no control over any variable. It defines an attempt to determine, describe or identify the situation as it is contrary to analytical research which describes why things exist or how things came about. Analytic research sheds light on current issues or problems via data collection. Analytic studies describe phenomena. These studies describe characteristics of sample population. This design was relevant in describing the situation in the current state (Manjunatha et al.,2019). External factors were examined to assess the impact on completion of projects.

3.3 Research Site

This research was carried out at Makueni County, Kenya. Makueni County is located in the Eastern Part of Kenya. It borders several counties comprising of Machakos to the North, Kitui to the East, Taita Taveta to the South and Kajiado to the West. It covers an area of 8,008.9 km^2 and has a population of approximately one million people. The county has six sub-counties namely Makueni, Mbooni, Kilome, Kaiti, Kibwezi East and Kibwezi West. The study dwelt on construction projects at the health facilities including hospitals, health centres and dispensaries managed by a doctor, clinical officer or nurse respectively.

3.4 Target Population

Soniae et al. (2022) explained that the target population is a defined population from which a sample has been selected properly. Analytic studies define a study population and later make inference on a sample derived from it (Soniae, 2022). The target population was all 238 projects conducted in the health facilities in Makueni county during financial years 2021/2022 and 2022/2023.

Table 3. 1 Target Population Table

The table is a list of all Health facility projects in Makueni County that initiated construction projects at the between financial year 2021/2022 and 2022/2023. The information was obtained from the Department of Health, Makueni County. (Appendix VI attached). The respondents were the facility managers who are key respondents as part of the project management committees. The Chief Officer, Chief Executive Officer and were respondents for selected projects.

Project Level	**Numbers**	**Percentage**	**Manager**
Hospital (Level 4)	11	4.5%	Medical Doctor
Health Centre	45	19.2%	Clinical Officer
Dispensary	178	74.7%	Nurse in charge
Level 5 Hospital	1	0.3%	CEO
Departmental Project (High Construction)	Level3	1.3%	Chief Officers
TOTAL	**238**	**100%**	

Source: Department of Health, Makueni County

3.5 Sample and Sampling Procedures

Kamara et al. (2020) explained that a sample is a determinate and representative sum of individuals or objects in a population to be studied. Mulan et al (2021) defines sampling design as the physical depiction of all the elements in the populace from which

the sample is drawn. This definition also incorporates the purpose of sampling design, which is to provide a means for choosing the particular members of the target population that make the respondents of the study.

This study used a stratified sampling method which divides a population into strata or subsets. It was appropriate for this study due to the geographical heterogeneity of the construction projects in Makueni.

$$n = \frac{N}{1+Ne^2}$$

Where:

n is the desired size

N is the total population

e is the degree of accuracy given at 0.05 testing at 5% confidence level

$$n = \frac{238}{1+238*0.05*0.05} = 150 \text{ respondents}$$

Table 3.2: Sample population table.

Project Level	Target Facilities	Sample Facilities	Percentage(%)
Hospital (Level 4)	11	7	4.7
Health Centre (Level 3)	45	28	18.7
Dispensary (Level 2)	178	111	74
Level 5 Hospital	1	1	0.6
Departmental High Level Project	3	3	2
TOTAL	238	150	100%

3.6 Data Collection

3.6.1 Data Collection Instruments

Primary data was gathered through the use of questionnaires. A questionnaire by definition is a set of questions that the researcher develops and distributes to the target population intending to gather data that will be analyzed to address the research questions (Anderson et al., 2022). The researcher sampled the 150 projects as shown in table 3.2 above. Secondary data was acquired collected from the records office in the Department of Health. Close ended questions provided an advantage of timeliness. The administration of the questionnaires was done by the researcher and two research assistants selected and trained by the researcher. The researcher and research assistants distributed and collected the filled questionnaires within a week of distribution.

3.6.2 Pilot Testing of Data Collection Instruments

Piloting a study is essential to evaluate the research tools and make any adjustments deemed necessary Piloting enables the researcher to make appropriate corrections if need be. Most researchers recommend piloting be done in a population akin to 10% of the sample size (Behncke, 2022). The pilot study was conducted among health facilities in Wote-Nziu ward, Makueni county to further evaluate the study tools. The ward had projects in a total of six projects. These projects were not included in the final research sample.

3.6.3 Instrument Reliability

The definition of reliability according to Mugenda and Mugenda (2009) is the consistency of two comparable measures. The reasoning is to which level these two comparable measures produce results that have no demonstrable error. Reliability of the research instrument will be tested using Cronbach's Coefficient Alpha (a test of internal consistency). The results of the pilot testing were obtained to confirm the research instrument integrity in conferring to the reliability test (Cronbach, 1951). To measure the reliability of the instrument, the researcher used internal consistency method to compute a coefficient Cronbach's alpha greater than 0.7.

Table 3.3 Reliability Test Results

	Cronbach's alpha	**Number of items**	**Reliability**
Political factors	.812	3	Reliable
Socio-economic factors	.786	3	Reliable
Technological factors	.811	2	Reliable

3.6.4 Instrument Validity

Validity refers to the extent to which a concept is accurately measured in a quantitative study. A good example is a study that is designed to measure absenteeism which actually measures lateness would not be considered valid. Another example of validity and reliability is an alarm clock that rings daily at 6:00 each morning, but is set for 5:30. The clock is reliable but is not valid. Mugenda and Mugenda (2009) define validity as a measure of the degree to which the findings of a study represent the actual phenomenon being studied. This is a direct measure of the research tool being able to collect the data or information it is meant to collect. The instruments including the questionnaires were thoroughly reviewed and checked before, during and after the pilot study to ensure the validity of the information given. The researcher consistently sought further guidance on content and construct from the supervisors to ensure validity of the data collection instruments is attained. A Content Validity Index was computed to ascertain validity of the instruments.

3.6.5 Data Collection Procedure

The researcher sought approval from the Africa Nazarene Business School prior to commencing the research process. An introductory letter was also acquired for presentation to all respondents. Approval was also sought from the National Commission for Science Technology and Innovation (NACOSTI). Respondents were required to give written consent before the data collection process. Primary data was collected by the researcher and two assistants.

3.7 Data Analysis Methods

Norris et al. (2020), analysis of data is the process adopted by researchers to reduce data from an array of content to an illustrative story and finally to interpret it and make insights. The data analysis process reduced a large chunk of data into smaller analyzable fragments. Data gathered via questionnaires was organized and prepared for orderly analysis and eventual presentation. The data was analyzed using Statistical package for social sciences (SPSS). This software application helped in the generation of both analytic and inferential statistics (Norris et al.,2020).

Comparison was done between independent and dependent variables. Continuous variables were expressed using mean, mode, median and standard deviation. Categorical variables were expressed as frequencies and proportions. Chi-square test was used to determine association between variables.

The regression model used was as follows:

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \varepsilon$

Where:

Y refers to the dependent variable= Completion of Construction Projects

B0 is the Constant

E is the error value

X1 is Political Factors

X2 is Socio economic factors

X3 is Technological Factors

A correlation analysis was conducted to establish the strength of linear association between the study variables. A regression analysis was conducted to provide necessary

statistics to reject or fail to reject the hypotheses of the study at 95% confidence level and 5% level of significance. The researcher used Statistical Package for Social Software (SPSS) version 25.0.

3.8 Privacy and Ethics

The researcher made sure that all ethical guidelines and requirements were adhered to. The rights of participants was assured and observed throughout the study. Participants that choose to opt out were respected. The names of the respondents were not recorded at any point in the research process. Ethical approval was sought from the ANU Ethical Review Committee and NACOSTI prior to commencement of the study.

CHAPTER 4

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction.

This chapter includes the analysis of data, interpretation of results and discussion. The main objective of this study was to determine the effect of external factors on completion of construction projects. Findings were presented as charts and tables.

4.2 Response Rate

The sample size for this study was 150. The researcher distributed 160 questionnaires to cater for any damages and received 150 questionnaires back. 94% returned questionnaires was satisfactory.

Table 4.1: Response Rate

Response Rate	**Sample,** *(n=160)*	**Percentage %**
Returned	150	94
Unreturned	10	6
Total	160	100

4.3 Demographic characteristics of the participants

The study evaluated the demographic factors of respondents before evaluating the effect of external factors on completion of construction projects.

4.3.1 Age and Gender of Respondents

Majority of the study participants were aged between 31.0 and 40.0 years old (56.0%). Majority of the participants were nurses (77.3%) which correlates to the aspect of most

projects being renovations of dispensaries. The majority had managed their facility for over 5 years (74.7%).The majority were working in a Dispensary (77.3%). The male and female participant ratio was 1:1. Table 4.2 below presents results of the characteristics of the study participants.

Table 4.2: Characteristics of the respondents

Characteristic	**Frequency,** *(n=150)*	**Percent**
Age in years		
21.0 – 30.0	15	10.0
31.0 – 40.0	84	56.0
41.0 – 50.0	30	20.0
>50.0	21	14.0
Sex		
Male	75	50.0
Female	75	50.0

Figure 4.1: Characteristics of the Projects

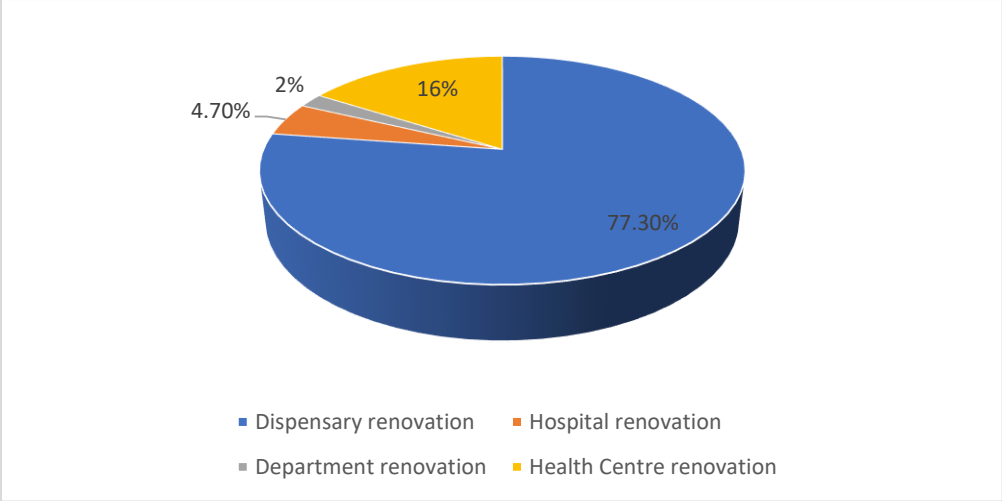


Figure 4.1 demonstrates the level of projects sampled. The majority were dispensary renovations while the minority were departmental renovations. The findings are in keeping with the fact that most of the projects were dispensary renovations.

4.4 Completion of construction projects

There were 150 projects that were assessed for their completion status, of which only 58 (38.7%) were completed, while 92 (61.3%) were incomplete. The results are as shown on Table 4.3. The findings indicate that the majority of projects do not reach completion. Projects in this category either fail to start or stall completely.

Table 4.3: Completion of construction projects

Projects completion	**Frequency,** *(n=150)*	**Percent**
Yes	58	38.7
No	92	61.3

4.5 Political factors on completion of construction projects

This section assesses the effect of political factors on completion of construction projects at the department of health, Makueni County, Kenya. Table 4.4 present the results of the assessment of these political factors.

The results indicate that there is less likelihood of the projects being completed if there is political involvement, transition in leadership, and delay in contract payment (OR 0.1, 0.7 and 0.3 respectively). Political involvement and contract payment were found to be statistically significant when it came to projects not being completed (p 0.001 and p 0.004 respectively).

Table 4.4: Political factors on completion of construction projects

	Projects complete		**OR (95% CI)**	**p-value**
Political involvement, *n (%)*	**Yes** *(n=58)*	**No** *(n=92)*		
Yes	47 (81.0)	89 (96.7)	0.1 (0.04 – 0.5)	**0.001**
No	11 (19.0)	3 (3.3)	Reference	
Transition in Leadership, *n (%)*				
Yes	47 (81.0)	79 (85.9)	0.7 (0.3 – 1.7)	0.432
No	11 (19.0)	13 (14.1)	Reference	
Contract payment, *n (%)*				
Yes	40 (69.0)	81 (88.0)	0.3 (0.1 – 0.7)	**0.004**
No	18 (31.0)	11 (12.0)	Reference	

4.6 Socio-economic factors on completion of construction projects

This section assesses the effect of socio-economic factors on completion of construction projects at the department of health, Makueni County, Kenya. Table 4.5 presents the results of the assessment of these socio-economic factors.

The results indicate that the likelihood of projects being completed is 2.7 times more likely with the availability of raw materials. The other factors assessed were presence of skilled labor and community participation. Raw material availability was significantly associated with completion of projects p 0.03.

Table 4.5: Socio-economic factors on completion of construction projects

	Projects complete		**OR (95% CI)**	**p-value**
Raw materials availability, *n (%)*	**Yes** *(n=58)*	**No** *(n=92)*		
Yes	33 (56.9)	30 (32.6)	2.7 (1.4 – 5.4)	**0.003**
No	25 (43.1)	62 (67.4)	Reference	
Skilled labor availability, *n (%)*				
Yes	21 (36.2)	47 (51.1)	0.5 (0.3 – 1.1)	0.075
No	37 (63.8)	45 (48.9)	Reference	
Community participation, *n (%)*				
Yes	36 (62.1)	66 (71.1)	0.6 (0.3 – 1.3)	0.216
No	22 (37.9)	26 (28.3)	Reference	

4.7 Technological factors on completion of construction projects

This section assesses the effect of technological factors on completion of construction projects at the department of health, Makueni County, Kenya. Table 4.6 present the results of the assessment of these technological factors.

The results indicate that the likelihood of projects to be completed is 1.1 times more wherever there is internet connectivity. None of the technological factors were statistically significant when it came to completion of projects. The results indicate that the likelihood of projects to be completed is 1.1 times more wherever there is internet connectivity. None of the technological factors were statistically significant when it came to completion of projects.

Table 4.6: Technological factors on completion of construction projects

	Projects complete		**OR (95% CI)**	**p-value**
Adequate technology use, *n (%)*	**Yes** *(n=58)*	**No** *(n=92)*		
Yes	26 (48.1)	46 (50.0)	0.9 (0.5 – 1.8)	0.829
No	28 (51.9)	46 (50.0)	Reference	
Internet connectivity, *n (%)*				
Yes	31 (53.4)	46 (50.0)	1.1 (0.6 – 2.2)	0.681
No	27 (46.6)	46 (50.0)	Reference	

4.8 Multivariate analysis

Three factors, 2 were political factors that is, political involvement and contract payment, while 1 was socio-economic factor which was raw material availability were statistically significantly associated with completion of construction projects. The 3 variables were subject to multivariate analysis with the use of Binary Logistic Regression.

4.8.1 Logistic Regression Output on Model Fit

Table 4.7 presents the logistic regression output on model fit which was statistically significant (r^2 = 0.249, p<0.001), as reported by the Nagelkerke R-Square. The model

compares the dependent variable (completion of projects), with the 3 independent predictors which are raw materials availability, political involvement, and contract payment explain 24.9% of the relationship.

Table 4.7: Test of model fit

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	169.7	0.184	0.249

Table 4.8 presents the results of beta coefficients (i.e. β) for use in the regression equation i.e.

$$y = \beta_0 + \beta_1 X_1 + \beta_1 X_1 + \beta_1 X_1 + \cdots \beta_n X_n + \varepsilon$$

On substitution:

$$y = 1.3 + 1.7\ (Raw\ materials\ availability) - 1.4\ (Political\ involvement) - 1.5\ (Contract\ payment)$$

4.8.2 Beta coefficients

Table 4.8 below demonstrates that the beta coefficient for raw materials availability is positive, which implies that availability increases the chance of completion of projects (y=dependent variable), while the beta coefficients of political involvement and contract payment are negative implying presence of the two decreases the chance of completion of projects.

Table 4.8: Beta coefficients

	B	S.E.	Wald.	df	Sig.	Exp(B)	Lower	Upper
Raw materials availability	1.7	0.4	15.6	1	0.000	5.3	2.3	12.2
Political involvement	-1.4	0.8	3.6	1	0.059	0.2	0.1	1.1
Contract payment	-1.5	0.6	7.5	1	0.006	0.2	0.1	0.6
Constant	1.3	0.7	3.7	1	0.054	3.6		

4.8.3 Multivariate analysis of factors on completion of construction projects

The results on Table 4.9 are a summary of the results of the significant variables on tables 4.4, 4.5 and also table 4.8. The results indicate that there were increased odds of completing construction projects from 2.7 to 5.3 times. This still remained statistically significant when compared with completion of projects. Multivariate analysis of political involvement revealed that the odds were more or comparatively still the same i.e. the less likelihood of the projects being completed, but the association with completion of projects was no longer there at multivariate level. Analysis of contract payment revealed that the odds were less or comparatively still the same or there was less likelihood of the projects being completed. Association of contract payments with completion remained statistically significant when compared with the completion of projects.

Table 4.9: Multivariate analysis of factors on completion of construction projects

	cOR (95% CI)	p-value	aOR (95% CI)	p-value
Raw materials availability, *n (%)*				
Yes	2.7 (1.4 – 5.4)	**0.003**	5.3 (2.3 – 12.2)	**<0.001**
No	Reference		Reference	
Political involvement, *n (%)*				
Yes	0.1 (0.04 – 0.5)	**0.001**	0.2 (0.1 – 1.1)	0.059
No	Reference		Reference	
Contract payment, *n (%)*				
Yes	0.3 (0.1 – 0.7)	**0.004**	0.2 (0.1 – 0.6)	**0.006**
No	Reference			

4.9 Summary of Findings

The goal of this study was to determine the effect of external factors on completion of construction projects in Kenya, a case study of the department of health, Makueni county, Kenya. This was attained by using three study hypotheses as shown:

a. **H_{01}**. There is no significant relationship between political factors and completion of construction projects at the department of health, Makueni County, Kenya.
b. **H_{02}**. There is no significant relationship between socio-economic factors and completion of construction projects at the department of health, Makueni County, Kenya.
c. **H_{03}**. There is no significant relationship between technology and completion of construction projects at the department of health, Makueni County, Kenya.

Table 4.10: Summary of Hypothesis Tests

Hypothesis	p-value	Decision
H_{01}. There is no significant relationship between political factors and completion of construction projects at the department of health, Makueni County, Kenya.	0.001	Reject
H_{02}. There is no significant relationship between socio economic factors and completion of construction projects at the department of health, Makueni County, Kenya.	0.03	Reject
H_{03}. There is no significant relationship between technology and completion of construction projects at the department of health, Makueni County, Kenya.	0.681	Fail to reject

CHAPTER 5

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction.

This chapter summarizes the findings of the study as expressed after analysis of the data. Comparison is done with the available empirical literature. Conclusions are made from the study findings. Recommendations are made based on the conclusions. Gap areas were identified and recommended as areas of further research.

5.2 Discussion.

This section discusses the key findings and makes a comparison with available empirical data.

5.2.1 Political factors and completion of construction projects.

The null hypothesis stated that there is no significant relationship between political factors and completion of construction projects at the department of health, Makueni County, Kenya. Based on this study, the null hypothesis was rejected. The results indicate that there is less likelihood of the projects being completed if there is political involvement, transition in leadership, and delayed contract payment (OR 0.1, 0.7 and 0.3 respectively). Political involvement and delayed contract payment were found to be statistically significant when it came to lack of project completion (p 0.001 and p 0.004 respectively). Multivariate analysis of political involvement demonstrated that the odds were more or comparatively similar (0.2). Analysis of delayed contract payment demonstrated that the odds were less or comparatively similar (0.2). The findings were comparable to earlier studies done globally and in the African continent. Beyene (2023)

directed a study investigating the effect of political factors on completion of construction project in Addis Ababa, Ethiopia which entailed a survey of 11 respondents who practiced actively in the construction industry (Beyene, 2023). Variations in leadership during elections were a significant factor in Ethiopia. Lack of permanency after elections meant that white elephant projects persisted as fragmentary. Interruption in payment of contracts to filibustering of major construction projects including health centers and learning institutions. Changeovers in management and appropriateness of payments of contracts were identified as significant challenges to project completion in several construction projects. Delay in payment of contracts led to stalling of major construction projects including hospitals and schools. Changeovers in leadership and appropriateness of payments of contracts were identified as significant challenges to project completion in several construction projects (Beyene, 2023). Members of County Assembly in Makueni County monitor and evaluate the construction process. They have authority to stop projects based on scope or budget queries. Unfortunately many stopped projects fail to restart completely.

The findings are also comparable to a study done by Moses et al (2019) analyzing the effect of micro and macro environment on implementation of relevant partnerships in the construction industry in Kenya. The study resoluted that lack of political goodwill will have a proportionate impact on the completion of construction projects. Delays in payments of contracts make it difficult for contractors to do routine checks within the six month periods after initial completion before commissioning.

The findings are also comparable to a study done by Osman et al (2019) gauging factors affecting the completion of construction projects in Mombasa, Kenya and sought

to measure how external factors Influence Project implementation performance in building construction projects in Kenya, to determine how leadership factors Influence The study sought to establish how cash flow factors Influence project implementation performance in building construction projects in Kenya, and to examine how Change of the project latitude influences project implementation performance in building construction projects in Kenya. The target was 220 respondents. The findings are comparable to this study. Respondents included key stakeholders in the construction space. Factors were obtained that were noted included political interference, shortage of raw materials, lack of resources, poor skills and high costs (Osman et al.,2019). This study correlates with the findings of many other studies as highlighted above. This may be due to the political aspect of monitoring and evaluation in most public projects.

5.2.2 Socio-economic factors and completion of construction projects

The null hypothesis was there is no significant relationship between socio-economic factors and completion of construction projects at the department of health, Makueni County, Kenya. The findings of this study led to the rejection of the null hypotheis. The findings indicate that the likelihood of projects being completed is 2.7 times more likely when there is availability of raw materials. The other factors assessed were presence of skilled labor and community participation. Raw material availability was significantly associated with completion of projects (p 0.03). The findings are comparable to a study done by Kharo (2023) assessing the extent to which socio-economic factors affect the completion of construction projects in Pakistan. Kharo (2023) directed a study weighing the extent to which socio-economic factors affect the completion of construction projects

in Pakistan. Pakistani construction projects have verified that there is a lack of an organized framework for measuring the impression of social and economic elements on project success. Therefore importance depends on determining social and economic elements and their impact on project performance measures. Wellbeing, land price, health, occupation and education were the top five social factors whereas the top five economic factors were efficiency, employment, conveyance, market access and indigenous market. Khahro et al. (2023) illustrated that lack of skilled manual labor and raw materials were key social factors having an impact on construction completion in Pakistan. More so, scarceness was a contributing factor to stalling of projects. This study did not demonstrate significance in the availability of skilled labor and completion of projects which can be attributed to the fact that Makueni government projects have pre-approved contractors who are expected to have have skilled workforce. This study demonstrated that skilled labor was not a barrier to completion of projects.

The findings of this study differed with Mavetera (2019) who steered a study to consider the impact of socio-economic factors on the construction sector in South Africa. Mavetera (2019) conducted a study to assess the impact of socio-economic factors on the construction sector in South Africa. The failure of a construction project can be attributed to a series of factors. Deriving from this framework, success and long-term sustainability have been identified as essential. Studies have demonstrated that social and economic considerations have a significant effect in project completion. The role of skilled manual labor was found to have a positive impact on the completion of projects. The study recommended the need of adequate supervision by all relevant departments Including public works (Mavetera et al.,2019). The role of skilled labor was found to have a

positive impact on the completion of projects by Mavetera (2019) contrary to this study. Ojiambo (2019) conducted a study to assess the extent to which social economic factors affect completion of construction in public schools in Bungoma, Kenya. Ojiambo (2019). Purposive sampling technique was adopted. A sample of 461 respondents was derived. The respondents were school heads and parents. The study identified key socio-economic factors including low skill levels, corruption and low integrity, lack of community participation. The study made relevant recommendations including skill training for the community as well as strengthening public participation (Ojiambo et al., 2019). The study in Makueni concentrated on health facilities which present a different demographic characteristic. This may explain the differences seen.

This study is comparable to the study done by Kihoro (2020). Both demonstrated a strong correlation between the availability of resources and completion of construction projects (p 0.03). Kihoro (2020) conducted a study analyzing the factors affecting outcomes of construction projects in Nairobi, Kenya. The study assesses timely completion and cost effectiveness. The study was an analytic survey. The findings demonstrated that the Kenyan construction sector was affected by the lack of adequate resources and skilled manpower for completion (Kihoro, 2020). Kihoro (2020) steered a study scrutinizing the factors affecting outcomes of construction projects in Nairobi, Kenya. The findings demonstrated that the Kenyan construction sector was affected by the lack of adequate resources and skilled manpower for completion.

5.2.3 Technological factors and completion of construction projects

The null hypothesis indicated that there is no significant relationship between technology and completion of construction projects at the department of health, Makueni County, Kenya. The results meant that the researcher failed to reject the null hypothesis.

The results indicate that the likelihood of projects to be completed is 1.1 times more wherever there is internet connectivity. None of the technological factors were statistically significant when it came to completion of projects. This is comparable to studies done in Sub Saharan Africa where internet connectivity and use of technology in the design process are often seen as luxuries as opposed to necessities. Chen (2020) analyzed the impact of modern algorithms in construction projects in China. Chen (2020) demonstrated that the use for technology in the project design is essential. Internet connectivity was also found to be essential for any modern project. The context was in the develop world as opposed to the Makueni county context where most projects do not have comprehensive use of technology.

This study was comparable to the study done by Abeysingye (2022) which scrutinized the impact of technological factors on completion of construction projects in Sri Lanka. Abeysingye (2022) investigated the impact of technological factors on completion of construction projects in Sri Lanka. Thirty nine factors were identified after interrogating 163 Construction Engineers. Timely completion is an important factor for the triumph of a construction project, particularly in the Sri Lankan situation. This study aimed to identify the most influential factors that affect the timely completion of construction developments in Sri Lanka. Thirty-nine factors were identified through a

inclusive literature search and dignified experts ideas. A questionnaire combining the 39 project delay factors was circulated among 163 Civil Engineers, and responses were attained. Random sampling method was utilized to select the sample. The Relative Importance Index (RII) scrutinized and tiered the project delay factors. The top ranked noteworthy project delay factors were identified as dearth of skilled subcontractors/providers, deficiency of drudges (Skilled, semi-skilled, unskilled), financial hitches of contractors, delay in transporting materials to the location and Covid-19 pandemic state of affairs. According to the main three respondent types that encompassed customers, contractors and consultants, the contractor related factors were the crucial group among others that interrupt a construction project. The scientific value of the study included supporting the Sri Lankan construction industry to categorize the factors affecting the timely completion of construction projects and developing mitigation methods and strategies. The key stakeholders could schedule the construction work in an orderly manner by identifying areas that need more consideration. The contribution of this study would be of utmost benefit to stakeholders to adopt a proactive approach by recognizing mistakes and reducing potential issues that lead to construction project delays in Sri Lanka. The crucial role for capacity building and oversight, particularly on technology use in construction was highlighted (Abeysingye.,2022). Similarly, poor internet connectivity was highlighted as a barrier affecting completion of construction projects. Lack of use of technology in the design process was a significant challenge. The need for capacity building and oversight, particularly on technology use in construction was highlighted. Abeysingye (2022) conducted the study in Syria which differed in

geographical context compared to Makueni county, Kenya. However, both studies reported a high odds ratio when it came to internet connectivity (OR 1.1).

There was no significant correlation between internet connectivity nor use of technology in the design process with completion of construction projects in this study (p 0.681 and 0.829 respectively). The study is comparable to a study done by Aiyetan (2022) evaluating the role and use of technology in the construction process in South Africa. Aiyetan (2022) directed an evaluation of mega projects in South Africa to evaluate the role and use of technology in the construction process. Mega-projects, particularly for the development of infrastructure, are being commenced progressively in many developing countries. Mega-projects are highly complex and involve significant construction activities. However, mega-projects in Africa face somber meets of delay and cost plunders because of their nature and the complexities involved. Therefore, using the context of mega-projects in South Africa and stakeholders' acuities, the factors that influence assembly and approaches that would alleviate the challenges and improve construction management at sites were scrutinized in this study. Factor analysis and ordinal regression modelling were used to scrutinize data gained from a survey conducted among participants. Findings suggested that five principal components and associated factors, including participants, plant and machinery, productivity, personnel and materials suggestively affect construction during mega-projects. Further, eight approaches that are aligned to stakeholder rendezvous, plants and machinery, productivity, human assets and materials are likely to expand construction management at sites of mega-projects in South Africa. The four most imperative approaches include making the availability of competent workforces for plant and machinery procedure and maintenance, effective

command and observing, the adoption of proper stakeholder engagement systems and ensuring clear and effective commitment, and the implementation of an advanced and effective communiqué system. Further strategies, such as the documentation of stakeholders and mutual goals and procurement and use of forward-thinking and quality plant and machinery, including the use of robotics and automation could progress construction at sites. Correspondingly, slants such as ensuring handiness of satisfactory and quality material and administration of the site for effective accessibility and operation, although likely to have reduced influence could also advance construction at sites of mega-projects. Ordinal regression modeling incorporated factor analysis to gauge data. The findings demonstrated that inadequate use of technology occurred and constantly led to delays and high costs. The study recommended early utilization of technology and observing during the process. The study demonstrated that an advanced and effective communiqué arrangement has been acknowledged as a key approach with forecasting being on the use of robotics and automation. This is projected to improve overall construction eminence. The use of technology continues to be essential with the growth of mega-projects (Aiyetan & Das, 2022). Similarly, most projects lacked access to modern technological services. Aiyetan (2022) demonstrated that inadequate use of technology that often led to delays and high costs.

5.3 Conclusions

The study concluded that external factors significantly affect completion of construction projects. This was key in the case of the department of health, Makueni county. The study also concluded that political factors affect the completion of construction projects. The most significant political factors include delay in contract

payments and political involvement. The study concluded that socio-economic factors affect the completion of construction projects. The availability of raw materials is a significant factor when it comes to the completion of construction projects. The study concluded that technological factors do not significantly affect the completion of construction projects. However, this may be a contextual challenge with most facilities in the African context lacking technological access.

5.4 Recommendations

This section will highlight recommendations to the different stakeholders captured in this study.

5.4.1 Recommendations for practice

The study recommends that key stakeholders involved in the construction management process such as politicians be taken through monitoring and evaluation training to ensure that projects are well management and all risks averted. The study recommends that contractor are paid on time to ensure that projects do not stall or fail to complete. The study recommends that proper planning is done by the health facility project management committees to ensure that raw materials are available on time. Proper planning should consider scope and cost of the project.

5.4.2 Recommendations for policy

The study recommends that counties performance contracts should be achievable to ensure that all initiated projects are completed on time. The study recommends that the

health facility project management committee should not be changed until the assigned project is completed.

5.5 Areas for further research

The researcher recommends further research on the effect of technological factors on completion of construction projects. The researcher recommends a comparative study between projects with access to technology and those without. This study will offer insight on this gap since it was not fully captured in this study.

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APPENDICES

Appendix I: Consent form

ANTONY MOGONDO KIBORE,
P.O BOX, 1957
MACHAKOS 90100
KENYA.

Dear Sir/Madam,
RE: DATA COLLECTION
I am a postgraduate student at Africa Nazarene University undertaking a Master of Business Administration degree in project Management. One of the requirements for successful completion before graduating is a thesis. My research topic is "**EFFECT OF EXTERNAL FACTORS ON COMPLETION OF CONSTRUCTION PROJECTS: A CASE STUDY OF THE DEPARTMENT OF HEALTH, MAKUENI COUNTY, KENYA".**
I have selected you as a key respondent in the study. This is to request you to accept the invite and provide diligent and honest answers to the questions provided in the interview guide. The information gathered will be strictly for academic purposes. Confidentiality of your personal information is assured. A copy of the final report will be availed to you upon request. Your co-operation will be highly appreciated.

Yours sincerely,
ANTONY MOGONDO KIBORE
antonykibore@gmail.com
0720860805

PARTICIPANT CONSENT
I have offered my informed consent as a participant in this study. I have understood the objectives of the study. I appreciate that my personal information will be treated with utmost confidentiality.

SIGN:…….

Appendix II: Questionnaire

EFFECT OF EXTERNAL FACTORS ON COMPLETION OF CONSTRUCTION PROJECTS: A CASE STUDY OF THE DEPARTMENT OF HEALTH, MAKUENI COUNTY, KENYA

Dear respondents, kindly respond to the questions candidly and honestly. The findings are relevant to my postgraduate academic research work. The study has a goal of determining the effects of external project factors on the completion of construction projects at the department of health, Makueni County, Kenya.

SECTION A: GENERAL INFORMATION

1. Gender: Male [ ] Female [ ]

2. What is your cadre?

Doctor [ ] Clinical Officer [ ] Nurse []

Departmental Head (ECM, Chief Officer) [ ]

3. What is your age bracket?

21-30 [ ] 31-40 [ ] 41-50 []

Above 50 years [ ]

4. How long have you been working in the Department?

Less than One year [ ]

1-3 years [ ]

3- 5 years [ ]

Over 5 years [ ]

5. What is the Level of facility you are managing?

Hospital [ ]

Health Centre [ ]

Dispensary [ ]

Departmental lead [ ]

SECTION B: External Project Factors

A. Political Factors

1. Does management within Makueni County affect the completion of construction projects in health facilities?

Yes [ ] No [ ]

2. Do transitions in leadership within Makueni County affect the completion of construction projects in health facilities??

Yes [ ] No [ ]

3. Do contract payments within Makueni County affect the completion of construction projects in health facilities?

Yes [ ] No [ ]

B. Socio economic factors

1. Does raw material availability within Makueni County affect the completion of construction projects in health facilities??

Yes [ ] No [ ]

2. Does skilled labor availability within Makueni County affect the completion of construction projects in health facilities??

Yes [ ] No [ ]

3. Does community participation within Makueni County affect the completion of construction projects in health facilities??

Yes [ ] No [ ]

3: Technological Factors

1. Does use of technology in the design process within Makueni County affect the completion of construction projects in health facilities?

Yes [ ] No [ ]

2. Does internet connectivity during construction within Makueni County within Makueni County affect the completion of construction projects in health facilities?

Yes [ ] No [ ]

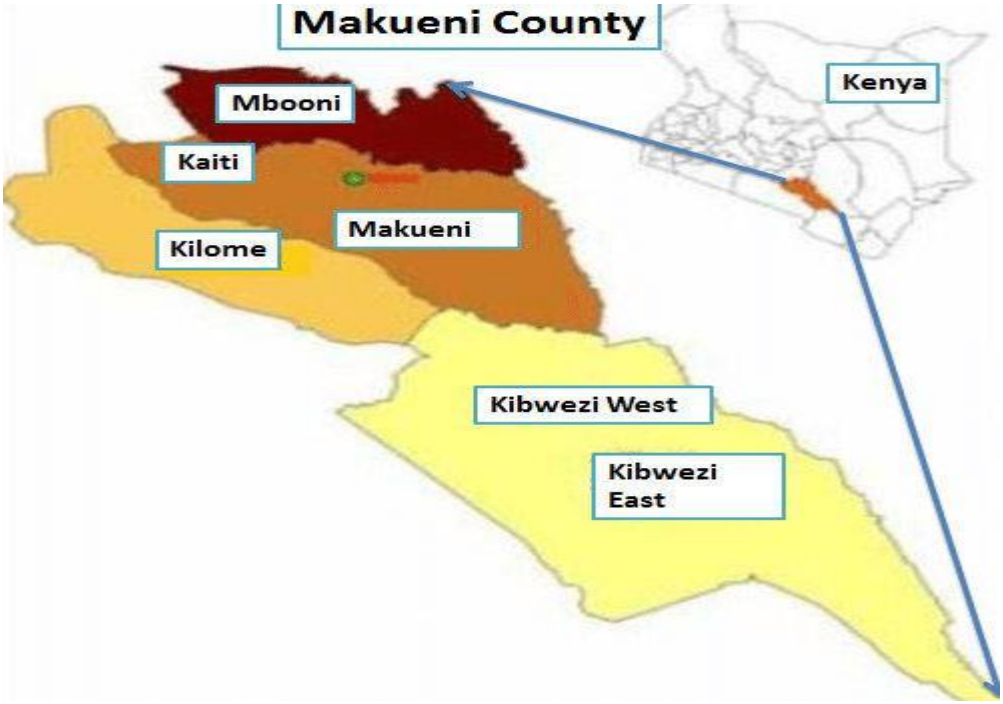
4 . Completion Status

1. Were the projects initiated within the health facility (renovations or new) in the previous financial year completed (commissioned)? *This item will be counterchecked in the County Development Records*

   Yes [ ] No [ ]

Your time and candidness in responding to the questions is highly appreciated.

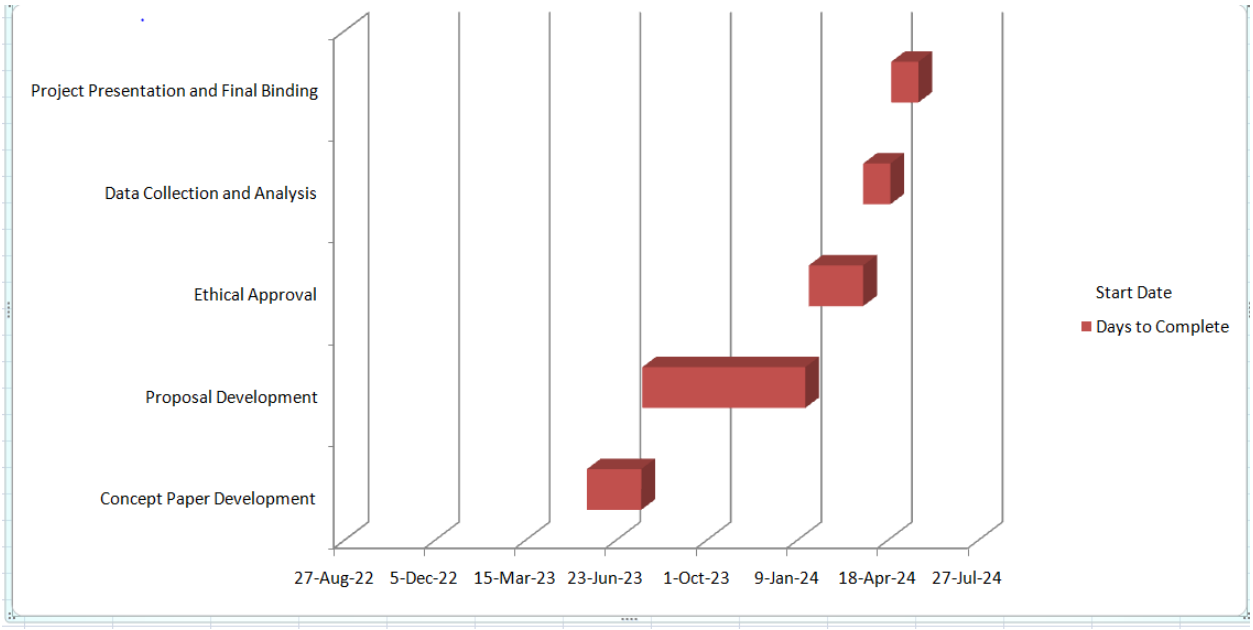
Appendix III: Map of Study Area



Appendix IV: Budget

No	Item	Cost
1	Literature Review process and secondary data collection	10,000
2	Printing, Photocopying, presentation of Proposal	8,000
3	Printing of Research questionnaires and consent forms	14,000
4	Data collection- Transport and other costs	10,000
5	Data analysis	28,000
6	Presentation and Binding of final report	8,000
Total		78,000

Appendix V: Work plan



Appendix VI: Health Facility Projects in Makueni County

REPUBLIC OF KENYA **GOVERNMENT OF** **MAKUENI COUNTY**

OFFICE OF THE DIRECTOR OF MEDICAL SERVICES

MAKUENI COUNTY-KAITI SUB COUNTY

Email: health@makueni.go.ke contact@makueni.go.ke
Website: www.makueni.go.ke

Ref: MKN/CHS/13/3/2023 13th Dec ,2023

Dear Sir/Madam,

RE: HEALTH FACILITY PROJECTS IN MAKUENI COUNTY

Below are the projects (renovations or new projects) initiated in Makueni County in financial year 2021/2022 and 2022/2023/

1. **HOSPITALS**: 12.
2. **HEALTH CENTRES**- 48
3. **DISPENSARIES**: 178

TOTAL 238

Hospital Manager-Doctor

Dispensary Manager-Nurse

Health Centre Manager- Clinical Officer

Thank you

COUNTY DIRECTOR OF HEALTH MAKUENI COUNTY 13 DEC 2023 P. O. Box 89 - 90100, MAKUENI Email: countyhealthmks@gmail.com

Dr Stephen Mwatha

Ag Director Preventive & Promotive Health Services

Makueni County

Appendix VII: Authorization Letter

8th, April, 2024

E-mail: researchwriting.mba.anu@gmail.com

Tel. 0202711213

Our Ref: 20M01DMBA018
The Director.
National Commission for Science,
Technology and Innovation (NACOSTI),
P. O. Box 30623, 00100
Nairobi. Kenya

Dear Sir/Madam:

RE: RESEARCH AUTHORIZATION FOR: ANTONY MOGONDO KIBORE

Mr. Antony is a postgraduate student at Africa Nazarene University in the Master of Business Administration (MBA) program.

In order to complete his program, Mr. Antony is conducting research entitled: "**Effect of External Factors on Completion of Construction Projects in Kenya: A Case Study of The Department of Health, Makueni County, Kenya**"

Any assistance offered to his will be highly appreciated.

Yours Faithfully,

DR. Kimani Gichuhi,

MBA, Coordinator,

School of Business,

Africa Nazarene University.

Appendix VIII: NACOSTI PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 322644

Date of Issue: 14/May/2024

RESEARCH LICENSE



This is to Certify that Dr.. ANTONY MOGONDO MOGONDO of Africa Nazarene University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Makueni on the topic: EFFECT OF EXTERNAL FACTORS ON COMPLETION OF CONSTRUCTION PROJECTS IN KENYA: A CASE STUDY OF THE DEPARTMENT OF HEALTH, MAKUENI COUNTY, KENYA for the period ending : 14/May/2025.

License No: NACOSTI/P/24/35321

322644

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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